THE IRON AGE — August 9, 1934

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NRA CODE GRAPHIC ARTS INDUSTRY 1934 Registration No. A-3-31-01596

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THE IRON AGE PUBLISHING COMPANY

F. J. FRANK, *President* — G. H. GRIFFITHS, *Secretary* — C. S. BAUR, *General Advertising Manager*

PUBLICATION OFFICE: N. W. Corner Chestnut and 56th Sts., Philadelphia, Pa.

EXECUTIVE OFFICES: 239 West 39th St., New York, N. Y., U. S. A.

Member, Audit Bureau of Circulations

Member, Associated Business Papers

Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50, including duty; Foreign $12.00 a year. Single Copy 25 Cents

Cable Address, "Ironage, N. Y."

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AUGUST 9, 1934

ESTABLISHED 1855

Vol. 134, No. 6

Get Back on the Main Road

COMMENTING upon the fact that more than 10,000,000 still lack work, the A. F. of L.'s latest monthly bulletin says that Government may have to take over the means of production, if private industry fails to contribute its share toward reemployment.

It is true that so far as putting men back to work is concerned, the loudly heralded recovery program has been somewhat of a fizzle. And yet putting men back to work was the essence of the program, the sine qua non of depression "busting."

Thus far, one year of the New Deal—the ten billion dollar cost of which, as Carter Glass warns, the tax payer must eventually foot—has put 4,000,000 men back to work. Of course this fortunate four million did not all march back to work at one time at the beginning of the NRA. They straggled back unevenly during the course of the past 12 months; some of them early in the period, some of them late. An arithmetical average would show that they have had not more than six months of work per man.

Just as the effectiveness of the recovery effort must be measured strictly by the number of employed that it puts back to work, so must its cost be measured. The public may be willing to dig down in its jeans to put men to work, because it knows this is a common-sense measure of self-preservation. But the public is not eager to spend its depleted wherewithal, at this time, for model homes at Reidsville, or the transformation of marginal lands into forest parks and game preserves or in policing battles instigated by attempts to make the blue eagle a union label.

Measured by the one unit that the public is willing to stand for, the unit of reemployment, the New Deal has cost or will cost the taxpayer—and this means every one with a wage envelope, an income or any possessions—the sum of five thousand dollars per man-year of employment secured by it!

The reason both for this high cost per man and for the failure to reemploy more than four million is simply this: The Government has gotten off of the main road of reemployment and recovery and is wandering in the uncharted detours of social reform.

We must get back to our job of building the main road to recovery, the road of reemployment. We must get real road builders at work upon it and dismiss the theoretical crew of professorial experimenters who have been leaving the road building job in order to explore the woods in the hope of discovering strange specimens of social phenomena to lay upon their laboratory tables.

No, the remedy is not more Government in business, as the A. F. of L. suggests, but fewer theorists in Government. Private capital and private industry will gladly follow practical road builders who know their job and who stick to it. But they will not follow the erratic wanderings of pedagogic "reformers" who, with all of their degrees, have not yet learned that a straight line is the shortest distance between two points.

Stainless Steel Commends Itself to

THE grand tour of the Zephyr signalized the "arrival" of stainless steel as a railroad material. The new train, of striking design, captured popular imagination and heightened interest in the rapid changes that have gotten under way in railroad transportation.

The metal-working industry, no less than the general public, was made more keenly aware of the carriers' determination to reduce their costs and regain lost traffic and of the earnestness with which they are wrestling with the problem of modernizing and improving their rolling stock.

Much of the work that has been done in this direction has definitely passed the experimental stage, as is made evident in this article. But there remains a wide field of opportunity for ingenuity in design and in the application of materials. The competition of different materials for preference is already keen and promises to become keener.

A general survey of the possibilities that have been opened up by new developments in railroad rolling stock, and especially in freight equipment, was published in THE IRON AGE of May 3, page 4. In our issue of July 12, page 10, the use of unit steel castings for freight car underframes was described. In THE IRON AGE of Aug. 2, page 18., aluminum as a railroad material was discussed.

THE recent nation-wide tour of the stainless steel train built for the Chicago, Burlington & Quincy Railroad by the Edward G. Budd Mfg. Co., Philadelphia, hastened the beginning of a new era in railroad passenger transportation, insofar as the steel industry is concerned.

The Burlington Zephyr, which is a self-propelled, three-car, articulated high-speed unit, was not the first light-weight passenger train to be placed in operation, into the construction of which stainless steel or competing metals entered. Its grand tour, however, was highly spectacular. The Zephyr actually took on a certain amount of personality as it sped over the rails and paused briefly to be inspected by curious throngs in the country's great metropolitan terminals. A world-famous musician or a national hero could not have been treated with more deference.

More recently a light-weight stainless steel multi-section car was placed in operation on the elevated tracks of the New York Rapid Transit Corpn. It was described in detail in THE IRON AGE, July 19, 1934, page 28 to 30. The debut of this unit, coming only a few weeks after the introduction of a similar car constructed

largely of aluminum, attracted only a moderate amount of attention. Yet these units are milestones in municipal transportation. Their operation on the antiquated elevated structures of New York which were built for the use of obsolescent wooden cars may solve a serious problem in New York's rapid transit system.

The Burlington Zephyr and the New York elevated unit are the most recent examples of the application of stainless steel in the two fields of rail transportation in which its greatest future application seems to lie. The potential tonnage involved is enormous. The financial problems which must be met are baffling. While they are not the chief concern of the stainless steel industry, it must be prepared to offer continued assistance.

If the exponents of stainless steel passenger car construction have solved the mechanical problems involved in this revolutionary type of equipment, they face now an even more serious task in demonstrating to the debt-burdened railroads and urban transportation systems that the relatively expensive light-weight units are economically justified.

First Stainless Steel Car in 1931

As is the case with other applications of stainless steel, its use in railroad passenger car construction is relatively new. The first unit built was the so-called Budd-Micheline car which was introduced in 1931. It ran on pneumatic tires, was electrically driven by a Junkers two-cycle Diesel engine and was capable of a speed of 40 miles per hr. With an overall length of 43 ft., the unit accommodated 40 passengers.

Soon afterward the Budd company constructed a one-car unit for the Reading Co. for Philadelphia suburban service and next a two-car train for the Pennsylvania. Both of these units ran on pneumatic tires and both were powered with Cummins four-cycle Diesel engines, the two-car unit having one in each car. The Reading car generated a speed of 50 miles per hr. and the Pennsylvania train increased this figure to 10 miles per hr. All three of these early installations were designed for suburban or interurban service.

It was not until 1933 that a stainless steel train was built for long-distance passenger service and this was installed by the Texas & Pacific Railroad for a specific run between two large Texas cities. Described in THE IRON AGE, Nov. 9, 1933, page 25, it consists of two cars, the forward unit carrying the power plant which is made up of two American-La France 12-cylinder, 240-hp. gasoline engines. The first car contains a 15-ft. railroad post office and baggage compartment and the entire unit has a seating capacity of 76. The forward car runs on steel wheels, the trailer on pneumatic tires, and the train develops a speed of 75 miles per hr.

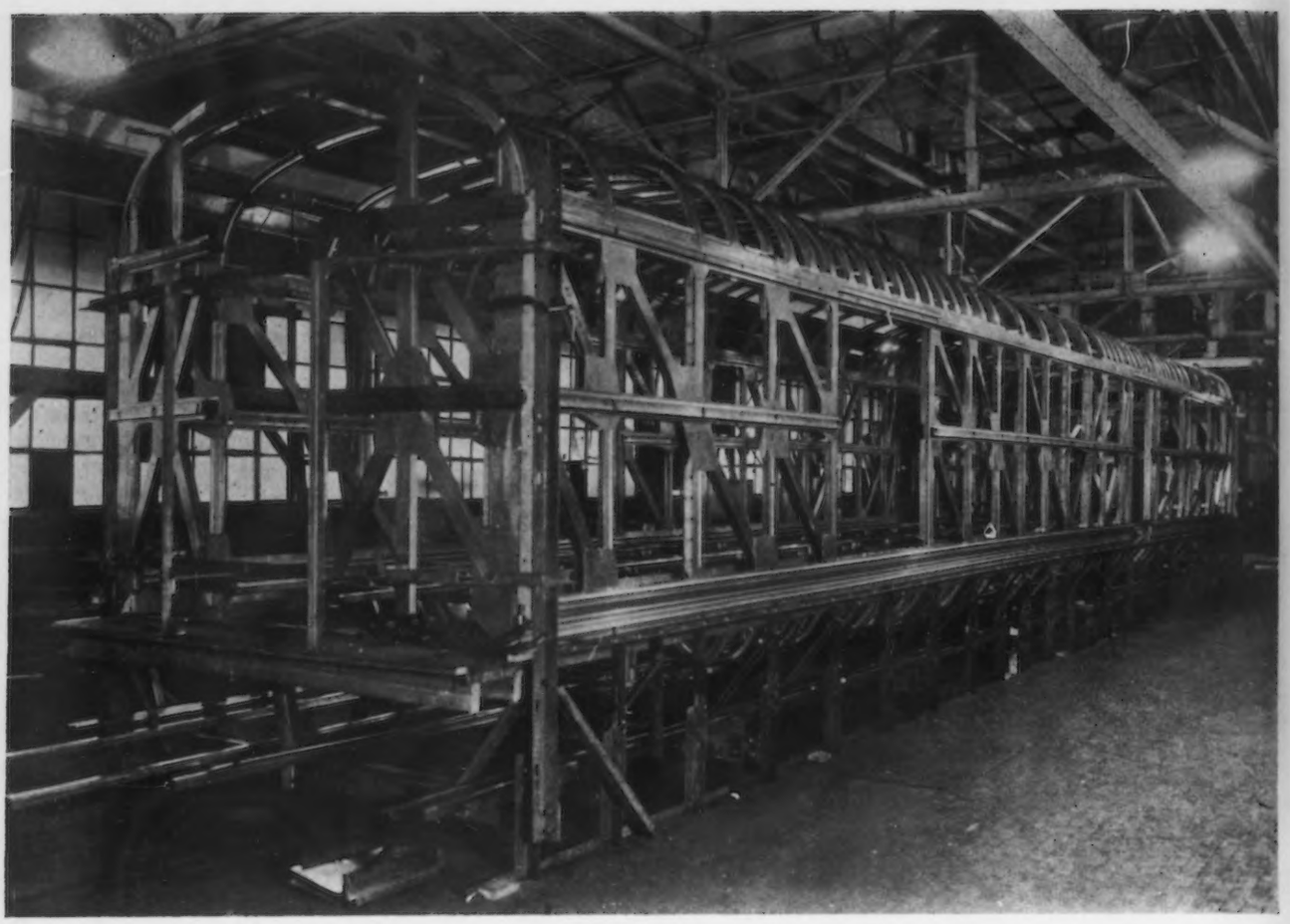
The construction details of the Burlington Zephyr are now generally familiar to the engineering public. The train is driven by a Winton 600-hp. Diesel-electric power plant and is designed for speeds up to 110 miles per hr. This required the shaping of the train to reduce air resistance both head-end and frictional. Wind tunnel tests have indicated that at an operating speed of 95 miles per hr. the total resistance to motion will have been reduced to about 47 per cent of that of a three-coach train of the same weight designed in the conventional manner.

The train consists of three car bodies carried on four trucks. It is 196 ft.

the Railroads

By T. H. GERKEN
News Editor, THE IRON AGE

The Burlington Zephyr at the Century of Progress contrasted with older types of passenger train equipment.



long and weighs approximately 195,000 lb. It carries seats for 72 passengers in the two rear cars while the first car accommodates 50,000 lb. of baggage and express. The first car also contains a 30-ft. mail compartment. Passenger facilities are divided among a 16-ft. smoking compartment, a smaller solarium lounge and a 31-ft. seating compartment which accommodates 40 persons.

The greater part of the body structure of the train from floor to roof performs load-carrying functions. The truss form of construction adapted by the Budd company for the utilization of built-up sections of thin-gage stainless steel fastened together by the Budd Shot-weld process is used. The main members of the car bodies are Pratt truss side frames which have been carried up to the roof by the use of diagonals in wide deadlights between the windows, and of which the roof forms the top chord. Most of the truss members are flanged box sections formed of deep flanged channels and cover plates fastened together by Shot-welds. The stainless steel used in these sections has a minimum tensile strength of 150,000 lb. per sq. in. and an elastic limit of 120,000 lb. per sq. in. with satisfactory ductility.

The floor structure is made up of corrugated stainless sheet steel, the bottoms of the rectangular corrugations of which are welded to a flat sheet. Both sheets are welded to the 11 longitudinal stringers which extend across each car. The stringers are secured to transverse supports built into the car frames. The floor thus permits the end loads to be distributed to the side girders.

The roof is a primary structural member assuming the entire compression load. It is built up of longitudinal corrugated stainless steel sheets welded to the roof carlines and is reinforced at points of maximum stress. The roof-sheet corrugations are 7/16 in. deep with a pitch of 1½ in.

Engine Bed of High-Tensile Steel

The engine bed of the Zephyr was fabricated by Lukenweld, Inc., and consists of a rigid arc-welded steel plate structure annealed after welding. The steel used is an alloy of chromium, manganese and silicon, designated as Cromansil, which was furnished by the Lukens Steel Co., Coatesville, Pa. It has a tensile strength of 90,000 lb. and an elastic limit of 70,000 lb. and possesses high resistance to fatigue and shock. The engine bed also serves as a bumper and bolster and is built into the lower chord member of the side trusses to form the foundation for the nose structure of the car. The entire bed is 25 ft. 3½ in. long and 8 ft. 8 in. wide and weighs 6070 lb.

Other Materials

Many other interesting materials applications occur in the train. The stainless steel sheathing is not all of the fluted type used in previous installations to prevent shear lines in the very thin material. Uncorrugated stainless steel sheets are used on the curved surfaces at the front and rear ends of the train, on the curved roof at the rear and on the roof over the engine room. At the front the steel is 1/8 in. thick, but elsewhere it is 0.030 in. material. Several makers of stainless steel supplied material for the Zephyr, including the American Sheet & Tin Plate Co., the American Steel & Wire Co., the Republic Steel Corpn., the Allegheny Steel Co. and the Superior Steel Corpn.

(At Left) Assembling a stainless steel car at the Budd plant. The truss form of construction is clearly shown. (Above) Interior of a car showing floor construction and roof reinforcement.

The deadlight panels of the cars are of Armorply, turned out by the United States Plywood Co. The material consists of plywood covered with stainless steel. The panels are flexibly mounted in channels at the top and the bottom where they are sealed with a plastic calking material.

Aluminum entered into the construction of the train in the insulation of the walls and roofs of the cars. They are insulated throughout with Alfol, a material which is made up of several sheets of crinkled aluminum foil weighing about 1/4 oz. per ft., board measure. It combines low conductivity with low convection air spaces and high reflectivity.

A wide variety of other materials went into the train but the examples mentioned serve to illustrate the fact that the construction of light-weight passenger trains will never be the province of one material or industry. The ultimate ideal will unquestionably combine a diversity of light-weight products, each of which is calculated to serve its particular purpose best.

A Word About the Power Plant

The generation of power for the new type of high-speed passenger trains remains a subject of considerable difference of opinion which will not be discussed here. The power plant of the Zephyr was designed by the Winton Engine Corpn., a subsidiary of the General Motors Corpn., and the main generator, exciter, auxiliary generator and traction motors were built by the General Electric Co. Power originates in a Winton 600-hp. high compression, two-cycle, 8-in. by 10-in., eight-in-line Diesel engine. Power for all auxiliaries is taken from the engine in excess of its rated output of 600-hp. at 750 r.p.m. The engine incorporates many novel features of construction and design, suggested by the possibilities of power economy afforded by streamlining railroad equipment.

Zephyr Built for Particular Purpose

While the grand tour of the Burlington Zephyr and its subsequent exhibition at the Century of Progress in Chicago have proved of tremendous advertising value to its owner, its builder and the makers of the materials which went into its construction, it was purchased with a definite practical purpose in mind. In the fall it will go into regular service between Kansas City, Mo., and Lincoln, Neb., making the 251-mile run in 4 hr. It is designed to reduce the cost of passenger train operation, especially of two- to five-car trains which are now operating at little or no profit. Its schedule on the Kansas City-Lincoln run will make possible the elimination of two locomotives and six passenger cars having a total weight eight times that of the Zephyr.

Speed Above 100 Miles Per Hr.

Recently the Boston & Maine Railroad placed an order with the Budd company for a stainless steel train to operate between Boston and Portland and Bangor, Me. Capable of speeds in excess of 100 miles per hr., its prospective schedule is somewhat more extensive than that of the Zephyr. Leaving Portland early in the morning the train will make a quick run over the 115 miles to Boston, then head north through Portland to Bangor, a distance of 250 miles, return to Boston and again come back to Portland ready to repeat the journey on the following day. Covering a total of 730 miles daily, the unit will replace two ordinary steam trains and reduce the running time over the route covered by 33 per cent.

Similar in many respects to the

Zephyr, the Boston & Maine train will consist of three cars, with accommodations for 148 passengers, complete buffet service and baggage space. It will be powered by a two-cycle, 600-hp. Winton Diesel engine in the forward car.

Application to Longer Runs

However, the practical use of high-speed, light-weight trains is not necessarily confined to comparatively short runs. The Burlington train recently ran from Denver to Chicago, a distance of 1017 miles in 13 hr., at an average speed of 78 miles per hr. The fuel oil cost was $14.88. The average much heavier steam train makes the run in 26 hr., at a fuel cost of $255. While such comparisons favorable to the light-weight train might not be made in regular service, the economic possibilities are no less apparent.

Edward G. Budd, president of the company which built the Zephyr, believes that the more immediate use of this type of train will be in overnight service between cities approximately 1000 miles apart and which now require from 18 to 24 hr. on the fastest trains. He has pointed out that the distance between New York and Chicago could easily be covered in 14 hr. on a train of this type, compared with the present scheduled time of 20 hr.

The running time might similarly be cut on many other trips of approximately the same distance between large centers where passenger traffic is comparatively heavy. Overnight schedules might easily be arranged between Boston and Chicago, New York and St. Louis, New York and Florida, Chicago and Denver, St. Louis and Denver, or Cincinnati and New Orleans. In transcontinental service, the 3200 miles between New York and San Francisco might be covered in 48 to 50 hr., compared with 4½ days at present and 20 hr. by the fastest scheduled plane.

Operating Costs Are Studied

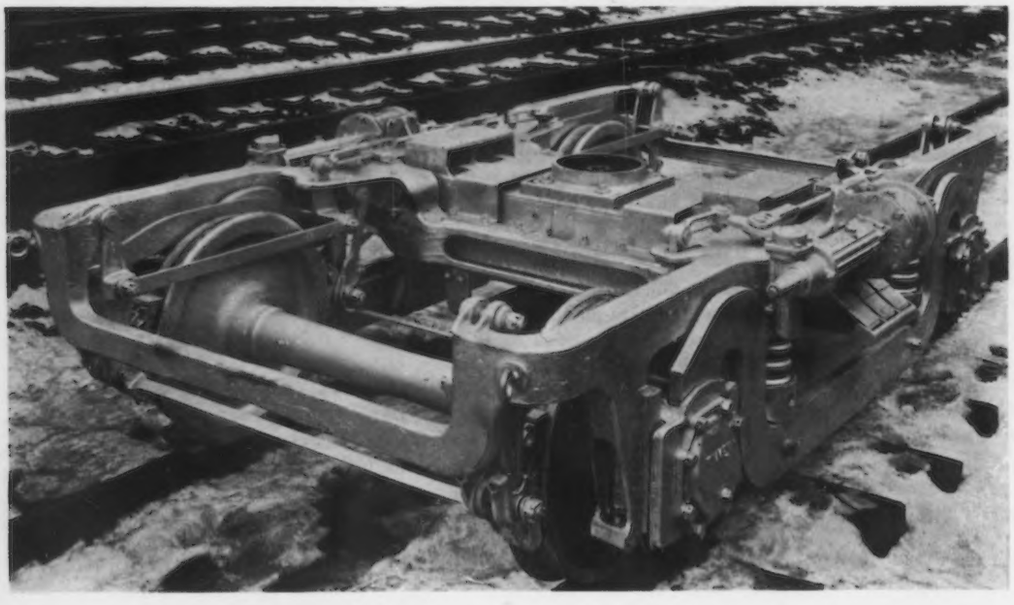
Despite the speeding up of service which can definitely be accomplished with modern light-weight equipment, the railroads could not afford to make the expenditures required for the installation of passenger trains of the new type unless operating costs could be greatly reduced. This subject has been given considerable study by the Budd company, and some of the conclusions reached were outlined by Mr. Budd in a lecture this spring at the Harvard Graduate School of Business Administration.

The carriers have realized for years that passenger traffic has not been profitable, but losses incurred have been made up by the increased efficiency in the carrying of freight. With freight traffic reduced sharply in the last four years, attention has been directed to the passenger transportation problem. There was a time when passenger service was profitable, but in the meantime equipment has grown heavier and therefore more expensive to operate, while travel has become lighter. Economies might be achieved by the operation of fewer and larger trains, but this would result in less patronage and further accentuate the problem. The most logical solution would seem to be the operation of lighter trains with reduced seating capacity in keeping present lighter travel, but which could be run at lower cost and consequently more frequently.

Definite operating costs are difficult to determine, but most persons are agreed that they are directly proportionate to the weight of the train. A typical passenger train of today, consisting of a Pacific-type locomotive and tender, a baggage car, four coaches, one diner and two parlor cars, would weigh approximately 1,600,000 lb. Such a train can accommodate 40,000 lb. of baggage and 380 passengers. Half capacity is now a fair average on most trains and thus 8500 lb. of dead weight must be moved in order to carry each passenger. On the other hand a light Diesel-electric train with a capacity of 236 passengers, with ample baggage and buffet space, would not weigh more than 230,000 lb., or less than 1000 lb. per passenger. If operated in fast and frequent schedules, such a train could unquestionably attract new business.

Cost of High-Speed Equipment

The present cost of a high-speed stainless steel train is not excessive. It is certain, however, that volume production would greatly reduce the price. If figured on a per pound basis rather than on a basis of earning power, the price difference between the old and new types of equipment is accentuated. A modern locomotive with tender costs about 18c. a lb. and a passenger coach about 20c. With material cost of stainless steel alone amounting to approximately 30c. a lb., it is difficult to imagine any kind of competition. A steam locomotive also costs about $30 a horsepower,



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The trailer trucks, like the engine bed of the Zephyr, are made of arc-welded Cromansil steel plates, annealed after welding.

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while Diesel-electric drive costs approximately $80 a horsepower.

But if the relation of cost to weight is taken into consideration, a different picture appears. Stainless steel sections of proportionately the same strength of equivalent carbon steel members weigh approximately one-eighth as much. Corrosion does not have to be considered in stainless construction and thus a very thin section may be used if the required strength is obtained. The price difference between 1 lb. of stainless steel and 8 lb. of ordinary carbon steel at 2c. to 3c. a lb. is not so great, and it may be assumed that stainless steel prices may be reduced as production costs are lowered by volume output.

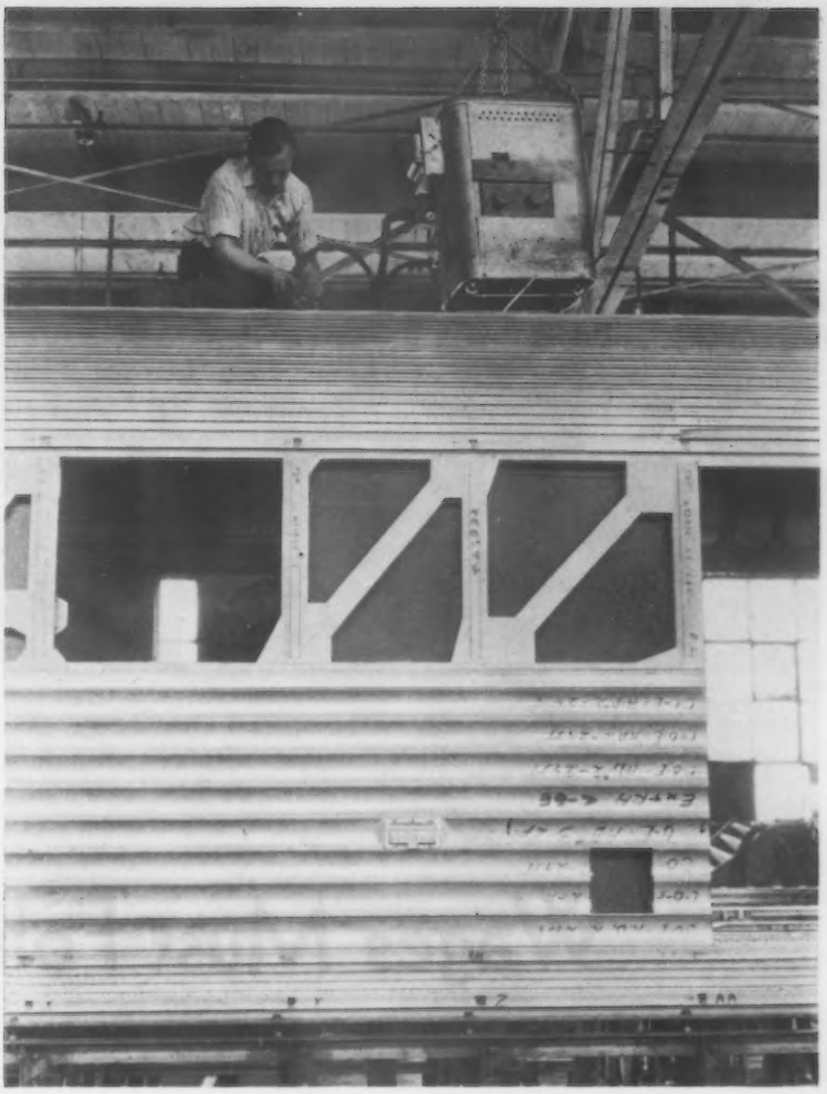
Mr. Budd has aptly pointed out that the cycle of weight reduction is such that 1 lb. saved in appointments saves another in structure; these two save a third in power plant, and all three justify a reanalysis with even further weight reductions. Finally the passenger of pay load becomes, for the first time, a significant part of the whole.

The steam train referred to previously, with its 3000-hp. locomotive and its total weight of 1,600,000 lb., costs aproximately $364,000. This represents an average of 22c. a lb., or $960 a passenger. The light-weight, 900-hp. Diesel-electric train, weighing 230,000 lb., would cost at present about $300,000. This figures to $1.30 a lb., or $1,270 a passenger. However, if figured at half-capacity for the steam train, or on a basis of only 180 passengers, the cost per passenger of the steam train would rise to $1,920 as against $1,667 for the light-weight train.

When figured on the basis of total operating costs at a free running speed of 70 miles per hr., the steam train would be $1.60 a mile and the light-weight unit 60c. a mile. If the free running speed is raised to 85 miles per hr., the respective costs become $1.85 and 70c. Steam train expense would then balance out with 44 passengers at 3.6c. a mile, while the lighter train would meet expenses with 30 passengers at 2c. a mile. At capacity, the cost per passenger on the light-weight train would be only about ¼c. a mile. The above figures are the result of an extensive survey of the subject made for the Budd company.

Safety Factor Not Neglected

The factor of safety is of great importance in railroad car construction and performance in case of collision must be carefully studied. In such instances, the car must be so built that its body will remain in approximately the original shape and thus serve as an inclosure to protect the passengers. Every precaution must be taken to prevent the car from collapsing. When one car collides with another, the force of the blow is proportionate to the weight of the car times the velocity. If two 70-ton cars collided at a speed of 40 miles per hr., the blow would be 530,000 lb. seconds. If a 30-ton car struck a 70-ton car, the blow would be proportionate to their combined weight and the damage to the 30-ton car would be proportionately less. It can thus be seen that if great strength of material results in less weight, the reduced weight lowers the collision force and makes for greater safety of operation.



The adaptability of the Shot-weld method to this type of assembling is clearly illustrated. The operator can make hundreds of welds daily with a portable welder.

The maintenance of passenger car equipment is an important factor in the cost of operation. Repainting alone runs into large sums. Painted surfaces have to be cleaned frequently, usually with soap and water. The high finish of stainless steel surfaces not only eliminates entirely the necessity for paint, but also prevents the adherence of foreign materials and a car so constructed may be cleaned by wiping or brushing off.

The highly polished outer surface of a stainless steel train also acts as an insulator against extremes of heat and cold. The lower heat conductivity helps to maintain a moderate temperature within the car. The general appearance of such a train, as demonstrated by the units recently placed in operation is unquestionably an asset to any railroad.

Wide World

Wages Must Follow the Price

IT is unfortunate that the ideal of "1926 price levels" has fostered the belief that we should aim for restoration of the price of each commodity to a fixed level, regardless of wide variations in intrinsic changes of processing costs. In a dynamic world, dead-level prices of individual commodities are a chimera; it is only through relative changes of price that the law of growth can work, and cause displacement of the outworn by the new. But that does not preclude the idea of managing the rate of change. If you tightly band up a tree, either the bands will be burst, or the tree killed; but you can remove deadwood and prune it to get a harmonious shape. So with our price-structure, once given stable money, and harmonious prices, we may be able to develop means to govern the rate of change and hold it within harmless tolerance limits of ½ to 1 per cent a month.

But what we have to deal with now is a condition of unstable equilibrium, due to sudden and arbitrary change of the price of the money metal. So instead of a problem in price stability, we have rather a problem in price readjustment, and of the speed at which it can be brought about. With a reduced gold equivalent of the dollar bill, money wages which were fair compensation are rapidly becoming inadequate and will have to be increased to keep our system in operation.

The blunt statement that the plant-owner must provide more money for wages is likely to provoke an explosive retort that he is already losing money. Yet I think it can conclusively be shown that now is the time when the owners must take the leadership with its risks, which it is their function to assume. Not only is the opportunity for greater profit now inviting, but on the other hand, there is the threat that unless the risks are taken, losses instead of profits will ensue. What however may be quite essential is some form of co-ordinated action, as suggested further below, to minimize the risks to the point where they can and will be taken.

If we had no consideration other than that of disposing of current production to those tied in directly to the processes of extraction, manufacturing and distribution, the solution would be the relatively simply one of pushing through the whole system a new stream of goods at a higher price level, based on higher money wages to capital as well as to labor; the minimum time for readjustment would

WITH a reduced gold equivalent of the dollar bill, says the author, money wages which were fair compensation are rapidly becoming inadequate and will have to be increased to keep our system in operation.

He believes that this disparity, produced by gold dollar devaluation is a fundamental cause of our widespread labor unrest which is

Wide World

# of Gold—2

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By H. P. LOSELY

be the time required to displace the old merchandise. That might range from one to six months, according to product.

Problem of Fixed Income

But as there are many people with rather rigidly fixed incomes, companies with regulated revenues, and existing long-term contracts no sensible person would wish to force through a 69 per cent rise in anything under a year, and as I pointed out in the first part of this article, the adjustment to the new gold price will require nearer to a 90 per cent increase. The rate of fall through 1930-31 seldom exceeded 15 per cent per annum, although one three-months period showed a drop of 6 per cent. We had in the war an increase at the rate of 50 per cent in one year, and that was accompanied by sharp increases in wages of a fantastic nature. The generation which has grown up since then has its own tribulations, but before it supports devaluation of its wages and a rocket-speed rise of prices, as the solution of its momentary troubles, it might do well to inquire about the social strains which resulted from those famous initials HCL, the high cost of living.

In any case, it would seem wise to manipulate the price rise with more consideration for the money-doctors than they have shown for industry and commerce, if only to give them time for retreat. The business world may be able to accomplish that gradual rise, in the way it should have been done in the first place, without changing the dollar. If business can manage to pay out more wages and salaries in the devalued money, we will be able to move more goods into consumption and avoid a jam of semi-finished inventories. As an example of waiting markets, Secretary Perkins recently cited under-consumption of bathtubs enough to run sanitary-ware plants to capacity for seven years.

The Myth of Over-Capacity

It is a great misfortune that the myth of over-capacity still prevails, so that reduction of operating hours has been widely hailed as a business restorative. For example the recent solid week shut-down of silk mills was only necessary because of insufficient purchasing power; the unsold accumulation was reported to be 60 million yards, not even enough for one dress all around.

Now the fact is that we have much over-capacity of obsolete plant, which

now so evident. If this is so, it will pay industry, he believes, to take a definite, coordinated leadership in making a scientific adjustment on a broad scale that will restore the wage, gold price parity.

Such adjustment, in the author's opinion, would greatly stimulate business volume and if correctly undertaken would be self-financing through increased total profits.

should be totally dismantled. But to shut down the good plant to give work to the bad one is a tragic error. On the other hand, if the good plants were run consistently to capacity, the reduction of overhead expense per unit made would permit an increase of wages in those plants of perhaps 50 per cent without any increase in price. With such augmented general purchasing power, we would discover that we have a shortage of modernized plants.

The rub comes, of course, in attaining the volume, since each business waits for the other fellow to supply not merely the initiative, but the buying power. That natural impasse can be most effectively broken by cooperative action. Each industry will readily agree that if all others were to increase wage scales by 10 per cent, and none were to cut hours below an efficient working rate, there would be about 10 per cent increase in dollars of general business volume.

Relation of Volume to Wages and Prices

How much would the physical volume increase if the cost of the raise were added to prices? Even assuming that the product is put through the average plant, and not diverted to the more efficient one, the average price rise would not be over 5 per cent. So we would see about 5 per cent increased physical volume, and with that, 5 per cent increase of working hours, however distributed. That is to say, there would be a 5 per cent increase of mass purchasing power and a reduction of under-employment by 5 per cent of the working population.

Assuming that industry passed on only the increased cost of current wages and salaries into the price—and consumer resistance is quite sufficient to induce such a policy—it would benefit by increased volume, and could then repeat the procedure, but not indefinitely. The system could stand just as many doses of that prescription as the existing idle equipment and man-power will permit, but no more. I am not proposing either a perpetuum mobile or an everlasting bull market!

A 10 per cent wage increase under present conditions would hardly generate over 5 per cent increase in prices, because the added volume would be made with men about equally efficient as those already at work, and with the same machinery; but with repeated doses, the added volume would be made with diminishing efficiency, both as to man-power and the type of machinery called into production. Each succeeding dose would be a little more severe in its effect on prices, and thus show less net increase of purchasing power and of volume. Carried too far, it would even diminish volume—which is just what brings on a depression.

The initial dosage would increase the gross profit in industry, due to constant contribution to overhead expense from each unit made. On the average, it would increase net profit (or decrease losses!) by about 1 per cent per annum on capital.

It must be emphasized that the economic basis for such a concurrently undertaken increase of wages is simply the production of more wealth by fuller use of existing machinery and available man-power. It avoids that economic absurdity of reducing productivity by curtailing working hours with one hand, while attempting to pay higher wages with the other.

Effect on Capital Goods Industry

In its report to the President on May 14, the durable goods industries committee correctly pointed out that their industries, in which almost 90 per cent of unemployment is concentrated, are unable to absorb either more workers or added costs, until their sales volume increases. Members of those industries have submitted estimates of the added cost of production with a 10 per cent wage increase and they range from 4 per cent upward. It is further pointed out in that report that an increase in volume depends upon further restoration of confidence in the economic future. I would like to pose the question whether a definite assurance of steadily rising prices for several months might not supply that confidence necessary to undertake additional operations.

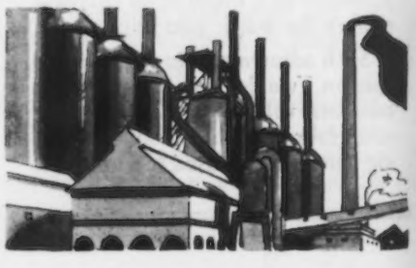
In other words, if the Administration, instead of asking for one 10 per cent raise in pay and a 10 per cent cut in hours—that was the request to the code authority convention in March—would ask for three successive raises of wages of 10 per cent each time, but without any further curtailment of hours, and spaced at intervals of 30 to 60 days, that basis

would receive prompt support from many, and could be sold to all, provided it were agreed that all coded industry and commerce would move simultaneously.

No Strain on Gold Reserves

The same report further stressed the need for wider use of the available credit supply. It pointed out that over 70 per cent of durable goods are made to order, not to stock; consequently these orders could be largely converted into commercial paper and discounted, with a resulting issue of Federal Reserve notes. The wide rush to cover future needs which would follow such a measure would permit the manufacturer and wholesaler to insist on discountable acceptances with orders. Such procedure would discourage the operations of the chiseler and the duplicate-order artist who is in the habit of cancelling at his own convenience. A 10 per cent increase of industrial pay rolls would require issue of about $200,000,000 new money per dose. Even five doses of that would be no strain whatever on our gold reserves as they are now used.

For it is really the equivalent of five doses that will be required to wipe out unemployment in industry. Recent reports indicate that the unemployed number about 25 per cent of those counted as working. If the first 10 per cent wage lift would cause reemployment of 5 per cent, it would take at least five doses to reabsorb all. That would incidentally bring the basic minimum wage to about 60c. an hr., which coincides with a different estimate I have made of the wage necessary, if the worker is to assume individual responsibility for his economic status, instead of leaning on government subsidies, doles, or what



have you left untried in the line of wasteful relief methods.

The essential motive to stimulate orders all along the line will be the definite program of increasing basic wage rates, and passing on the added labor cost in the form of progressively advancing prices, until a sound equilibrium with gold production costs is reached. With advancing prices, but a still faster advance in purchasing power, there will be not only incentive to early placing of orders, but prompt conversion of payroll money into manufactured goods and liquidation of the commercial paper. The accumulated supply of semi-finished inventory will thus be drained off and we will again have healthy circulation.

If I have only suggested a series of three general raises, rather than five, it is because of other forces beyond this discussion. In any case, the blanket method is not suited to a full correction of the many existing maladjustments. To the extent outlined, however, it would be advisable as a counterbalance to the monetary action taken. The effect of increasing wage rates will be profoundly stimulating to the capital goods industries; higher wages will at once encourage the installation of improved machinery and provide a marked reemployment in making equipment. So this half-way correction should bring about sufficient recovery to relieve the worst strain, generate new momentum, and provide an atmosphere for discussion of methods of sane reform. There are some who fear that if the business man is again making a profit he will be less interested in reform. Perhaps so; but a partial recovery will only permit the efficient to make a profit, and it is safe to predict that coming topics of taxation and increased cost

of living will not permit us to neglect measures of economic reconstruction.

In conclusion, I would stress that it is only by engineering a widespread wage advance that we can counteract the monetary action taken and so minimize labor distress and strife. The price question subsequently will be whether we can invoke the aid of technology sufficiently to make a more gradual and normal advance of wages, return to our old American ideal of high wages and low costs, with enough dispersion of technological gains to prevent too drastic a rise of commodity prices.

Weighing all these factors in the light of past performance, even assuming a somewhat more rapid shift of production to the efficient plant, the price level is headed for at least 140 per cent of 1926—or war-time prices—and the speculative swing may carry some of them well over the 1919 tops. That is not a promising outlook, as it

will be accompanied by many injustices. The only factor which may mitigate the rise, other than a decreased price of gold, is an increasing shift of production to the most efficient plants, and that will require a greater degree of national planning than we seem as yet willing and ready to accept.

Certainly a counter-move by the business world along the lines indicated, by stimulating a wide price rise, would promptly line up new forces against further confiscation of savings via the route of more devaluation.

Pouring Temperature In Casting Red Brass

CAST red brass has lately been the subject of investigation at the U. S. Bureau of Standards. The studies were sponsored by the Non-Ferrous Ingot Metal Institute in the interest of simplifying the number of compositions of copper-base ingot metals. A report of the work has been contributed by C. M. Saeger, Jr., physicist, Bureau of Standards, to the Institute of British Foundrymen as the 1934 exchange paper from the American Foundrymen's Association.

The research covered was restricted to a brass with a nominal composition of 85 per cent copper, 5 per cent tin, 5 per cent zinc and 5 per cent lead. Alloys were prepared from both virgin and remelted metal. The most important results were given as follows:

The properties of test bars made of virgin or of remelted metal of the same nominal composition, cast at the same temperature, were alike.

The pouring temperature affected the properties of all the test bars much more than any other factor. In general, the best results for the sand-cast bars were obtained with a pouring temperature below 2200 deg. F. (1205 deg. C.).

These effects of pouring temperature on the physical properties of test bars were the same for alloys containing either sulphur (maximum 0.10 per cent) or iron (maximum 0.6 per cent).

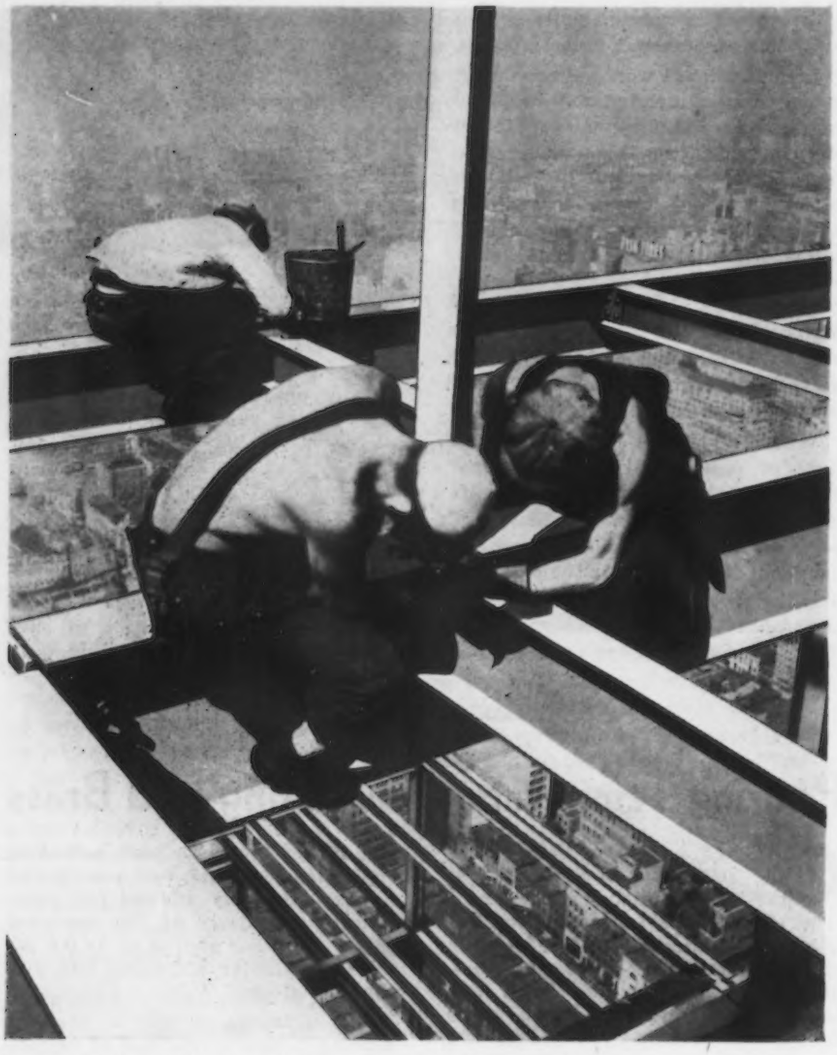
The physical properties of test bars poured at 2100 deg. F. (1150 deg. C.) or below were not appreciably affected by the presence of sulphur up to 0.10 per cent. In bars poured at higher temperatures, 0.10 per cent of sulphur adversely affected the properties, particularly of the sand-cast bars. Additions of iron up to 0.6 per cent had similar but much less pronounced effects.

The detrimental effects of high pouring temperatures and of impurities were much more pronounced in the sand-cast bars than in the other types. The non-uniform grain structure of the sand-cast bars and the existence in them of a strained condition during cooling probably are related to these effects.

The flowing properties increased with the pouring temperature. The presence of sulphur, up to 0.10 per cent, improved the flowing properties, while iron had no consistent influence. Similar statements apply to the shrinkage.

A comparison of the results for tensile strength and hardness with the minimum requirements for this alloy in ingot form set forth by the American Society for Testing Materials shows (a) that the end-gate sand-cast bar is unsuitable for low pouring temperatures, (b) that, with this exception, all sand-cast bars of virgin or remelted metal poured at a temperature not exceeding 2200 deg. F. easily meet these minimum requirements, and (c) the presence of sulphur up to 0.10 per cent or of iron up to 0.6 per cent is not objectionable in sand-cast bars. The adverse effect of pouring temperatures above 2200 deg. was not so pronounced in the chill-ingot and other bars as in the sand-cast bars.

How



Painting of structural steel is a vital process in its erection. It is hazardous work and calls for well trained men. Good practice in this field is to use the best available materials, as usually the steel is never painted again after the building has been completed.

METAL products and paint are inextricably associated. For better appearance and protection against corrosion, a large part of all metal products is painted or enameled, and the very process of painting, which, in most cases, becomes a significant production operation, calls for the use of a large amount of metal for equipment and auxiliary apparatus. Large metal enclosures with elaborate exhaust systems are used for painting buses, trucks, and railway equipment. The manufacture of paint itself calls for a heavy tonnage of metal. In 1931, 100,000 tons of lead and antimony entered into the manufacture of paint, yet the importance of correct technique in painting metal products is still insufficiently understood. In a group of several articles on painting, of which this is the first, some of the important factors involved in the painting of metal and metal products are described.

This series is being prepared under the direction of Mr. Simonds for THE IRON AGE. Mr. Hallett is associated with The National Lead Co.

By R. L. HALLETT and HERBERT R. SIMONDS

SURELY everyone will grant the importance of steel bridges, steel buildings, and steel ships in our present highly developed civilization, but it is not so universally understood that these steel structures, costing vast sums of money, would have short life and could not be successfully built and maintained without the protection of paint. A multiplicity of other important metal products attains greatest value in industry by being painted or enameled, and each year American companies manufacture more than 150,000,000 gallons of paint, varnish, enamel, and lacquer having a value in excess of $200,000,000. While these figures are commercially impressive, they are insignificant in comparison with the importance of the structures which are thus protected and decorated.

The steel and allied industries consume a fairly large proportion of all manufactured paint products, and there is a close bond of mutual advantage between these commodities. Paint finds a good market as a coating for metal, and metal finds a good market in the paint industry. Lead, zinc, antimony, aluminum and other metals are used in paint production. Steel and tin are used for paint containers, and a heavy tonnage of steel and other metal is used each year for such painting equipment as sprays, drying rooms, spray booths, exhaust and blower systems, material handling apparatus, dip tanks, bake ovens and sand blast machines.

The broad term "painting" is used in its generic form to designate the application of decorative and protective coatings, whether they be paint, enamel, lacquer, varnish, or even lithographic coatings. Even technically it is sometimes difficult to differentiate between these different types of coatings, because in character and composition they may merge one into another. However, to be specific, several different types of protective coatings may be briefly defined as follows:

1. *Paint:* Paint is a mixture of opaque pigment with non-volatile oil or vehicle, with or without the addition of volatile thinner. It is applied in the form of a liquid in thin films and after application dries to form hard, tough, elastic coatings. The

Attractive Finish Helps Metal Products Sales

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non-volatile liquid portion of paint is one or more of the vegetable drying oils which dry and harden by absorbing oxygen from the air, thus paint films dry substantially by oxidation.

In the metal industries, paints have many important uses such as the protection and decoration of steel bridges, buildings, ships, ornamental sheet metal and iron work, and many manufactured metal products.

2. *Enamel:* An enamel is similar to a paint, as it is a mixture of opaque pigment with non-volatile vehicle and volatile thinner, but it differs in that the non-volatile vehicle is essentially a varnish which dries and hardens both by oxidation and evaporation of the volatile thinner.

Industrial enamels are extensively used on many kinds of manufactured metal products such as machine tools and other machinery, railroad equipment, sheet metal containers of different kinds, and innumerable smaller metal products.

3. *Lacquer:* At the present time the term "lacquer" is properly used to designate a solution of nitro-cellulose in a volatile solvent with or without opaque pigment. Prior to the introduction of nitro-cellulose lacquer, the term "lacquer" was rather loosely used.

The most important use for lacquer is for finishing modern automobiles, but it is also used on motorcycles, bicycles, metal furniture, and on many specialty metal products.

4. *Varnish:* Varnish is a clear solution of resins in vegetable drying oils, thinned to liquid consistency with volatile solvents. Varnish dries both by oxidation of the oil and evaporation of the volatile thinner.

Clear varnishes are not as important in the metal industries as paint, enamel, and lacquer, but are used to some extent where clear finishes are desired.

5. *Lithographic Coatings:* Lithographic coatings vary greatly in composition and use. Generally speaking, they are enamels which are baked after application and, technically speaking, are any of several coatings applied by printing processes.

Lithographic coatings are used on sheet metal containers of different kinds such as cans and tubes, and wherever small sheet metal articles can be economically handled by printing processes.

A recent development, described earlier in this series under "Prefinished Raw Materials," is the lithographing of steel sheets which are later stamped and formed into the finished article.

Many long steel pipe lines are painted on the inside for protection against the effect of gas or chemicals. The shows a special type of buggy used in painting the inside of a long line 3 ft. in diameter.

Paints and Their Uses

Paints may be classified in different ways: for instance, based on the structures or products on which they are to be used, based on whether they are designed to dry with a gloss or flat finish, or based on whether they are intended for exterior or interior exposure. The non-volatile vehicle of most paints is linseed oil, although other drying oils are used to some extent.

Under one classification, paints may be divided into white and light tints; in another, into dark colors. Light paints are made with a white base, and for durable exterior exposure the white pigments used are white lead, titanium-barium pigment, titanium oxide, zinc oxide, and basic lead sulphate. For interior use where the exposure is less severe, light paints may be made with a white base containing titanium-calcium pigment or lithophone, as well as the other white pigments. For exterior exposure the light paints are usually the finishing coats used to obtain decorative finishes.

The priming coats, which are required to prevent rusting and corrosion of metal, are usually red lead paints containing no white pigments. Blue basic lead sulphate is sometimes used in priming coats for metal surfaces.

Paints which are so dark in color that they cannot contain any white base include not only red lead paint priming coats but also many finish-

ing coat paints where such strong dark colors as yellow, green and black are required. Such dark colored paints are made with the pigments needed to give the desired color, in which case the non-volatile vehicle is linseed oil. Some of these paints contain varnish, and have enamel or semi-enamel characteristics.

Aluminum paint contains no white base, but has a light gray color and might be considered in a special class. Aluminum paint is sometimes used for a finishing coat where its particular color and surface sheen are wanted.

In the classification of paints according to their surface finish, there may be gloss or flat paint, or an intermediate semi-gloss frequently known as "egg-shell" paint. The essential difference between gloss and flat paint is the proportional amount of pigment as compared to the non-volatile vehicle. If the paint contains a high proportion of oil or non-volatile vehicle by volume, the oil will flood the pigment, allowing the pigment particles to recede from the surface, and the paint will dry with a smooth, even, plain surface with high gloss.

If the paint contains a small proportion of oil with volatile thinner added to give brushing consistency, the rapid evaporation of the volatile thinner will leave a coating with insufficient oil to flood the particles of pigment, and the pigment particles will pile up on each other and extend through the surface of the paint in a broken manner resulting in more or less complete diffusion of light reflected from the surface and giving what is known as a "flat" finish.

In addition to the above classification, paints should be selected according to the structures or products on which they are to be applied, and may vary in composition, color and surface finish, according to requirements. As the non-volatile vehicles of paints consist principally of linseed oil and other vegetable drying oils, drying is almost entirely by oxidation, and contact with the air is necessary.

Enamels

What has been said about paints applies almost equally to enamels, as they vary widely in composition, color and character of finish. Popular conception is that enamels dry with a high gloss finish, and this is true of most enamel products, although there are some enamels which dry flat or with an egg-shell finish. It might be said that the principal use for paints is for the exterior or interior surfaces of large permanent structures, whereas the principal use for enamels is for finishing manufactured metal products, although there are exceptions in both cases. Technically speaking, enamels are made with gum or resin varnish vehicles containing some linseed oil or other vegetable drying oils. For this reason enamels dry partly by oxidation and partly by evaporation of the volatile thinner which causes a "set" of the non-volatile portion of the varnish. Enamels are made to dry either by exposure to the air or by baking, depending on the requirements in each individual case.

Lacquers

Lacquers are essentially solutions of nitro-cellulose in certain organic solvents which dissolve the hard nitro-cellulose material to form a liquid which may be applied in thin coatings. If nitro-cellulose alone were used, evaporation of the volatile solvent would leave a hard, brittle coating, and for this reason small amounts of other non-volatile materials known as "softeners" and "plasticizers" are added. Lacquers may be used in the form of clear coatings or with the desired pigments to make opaque coatings of different colors. They dry entirely by evaporation of

All steel bridges are carefully painted, first in the shops and then in the field. More than 10,000 lb. of red lead paint was used for the field coats of this railroad bridge. For the field work of the George Washington Bridge more than 36,000 gal. of red lead paint were used.

the volatile solvents, leaving the non-volatile portion in the form of a hard film.

Varnishes

Varnishes are clear liquids consisting of solutions of gums or resins in one or more of the vegetable drying oils thinned with suitable volatile liquids so that the thick, viscous, non-volatile combinations of oil and gum or resin will have the proper liquid consistency for application. Linseed oil and china wood oil are the principal drying oils used in making varnish, although some other oils are utilized to some extent. A generation ago varnishes were largely made with natural fossil gums and resin, but today varnishes are made almost entirely with modified resin compounds such as ester gum and synthetics such as phenol-formaldehyde and glyptal resins. Because the non-volatile portion of varnishes consists of both drying oils and gums or resins, varnishes dry both by oxidation and by evaporation of the volatile thinners. Varnishes are designed to dry either by exposure to the air or by baking, as conditions require.

Lithographic coatings are similar to paints and enamels in composition, and from the point of view of composition they probably should not be considered as in a separate class, but they are generally applied by some printing process, and it is this method of application which has resulted in their designation as lithographic coatings. After application, the coatings are usually baked.

Painting Metal Structures and Metal Products

Paint which will give the greatest satisfaction and lowest upkeep cost on a steel bridge may be equally satisfactory on a viaduct, elevated railway structure, water tank, standpipe, metal cornice, or any one of innumerable other metal surfaces directly exposed to similar weather conditions. The great similarity in the painting of such structures is in the priming coat, which is equally suitable for all of them, and in many cases there is no difference in the body and finishing coats, although the finishes may show wide variations, depending upon the color and effect desired, because it must be remembered that paint is used both for protection and appearance. Metal structures and metal products may be broadly divided into a few major classes where the paint materials used and the methods of application are more or less the same for each class. Here we are considering principally the painting of iron and steel, which are the products used for a vast majority of metal structures and products.

▲ ▲ ▲

In the face of rapid strides toward labor saving operation in most fields, painting of bridges is today practically the same operation as it was 50 years ago. There has been a remarkable improvement in materials, but practically none in method of applying them. This shows the maintenance painting of Brooklyn Bridge, a process which has been going ahead almost constantly during half a century.

▼ ▼ ▼

Steel Bridges

This class includes fabricated steel structures such as railroad and highway bridges, viaducts and elevated railway systems. The first and most important painting problem is the priming coat on the bare metal, which must be relied on to protect the metal against corrosion and to furnish a suitable foundation for the subsequent coatings of paint. It is generally considered standard practice by the large railroads, highway departments, and fabricators of steel structures to use red lead paint for the priming coat next to the metal. This is made with pure red lead pigment and linseed oil with a small amount of drier and with or without a small amount of volatile thinner. It would seem that this is a simple formula, but many variations are possible in the kind and character of red lead used, and in the proportions of red lead and linseed oil. Some kinds of red lead are better than others, and the proportions of red lead and linseed oil must be kept within fairly narrow limits if the best results are to be obtained.

Red lead is made by a furnace treatment of litharge, which is the lower oxide of lead, and in this treatment the litharge is further oxidized to the higher oxide form, and the red color is developed. The extent to which this further oxidation takes place in the manufacture of red lead determines the character and usefulness of the red lead to a marked degree. There are really three distinct grades of red lead used for paint purposes which are classified in accordance with their degree of oxidation and are designated as 85 per cent, 95 per cent, and 97 per cent red lead, which means that they contain these percentages of true red lead, or, in other words, the litharge has been oxidized to an extent corresponding to these percentages. The 85 per cent grade is usually coarser than the more highly oxidized material and contains a considerable amount of unoxidized litharge which is not desirable for the best red lead paint.

The most satisfactory red lead pigment for iron and steel paint is the

For adequate protection and continuing good appearance, steel must be properly prepared and the right kind of paint must be used. This shows what happens after less than a year's weathering of a poor paint job.

97 per cent grade with uniformly fine particles. Many scientific tests and long practical experience have demonstrated that this highly oxidized red lead produces paint films on iron and steel which have durability and which protect the metal against corrosion for a great length of time. Even if the best grade of red lead is used, the most satisfactory paint will not result unless the red lead and oil are properly proportioned.

A satisfactory red lead paint for the priming coat on iron and steel is a mixture consisting of 33 lb. of red lead to 1 gal. of linseed oil. If raw linseed oil is used, a small amount of drier must be added, but if boiled linseed oil, or a mixture of boiled linseed oil and raw linseed oil is used, drier is not required because sufficient drier is contained in properly made boiled linseed oil. Considerable red lead paint of somewhat lighter formula than 33 lb. to the gallon of linseed oil is used on steel structures, but for the best results the paint should contain not less than 28 lb. of red lead to 1 gal. of linseed oil.

At least three coats of paint should be applied on a new steel structure, and the second or body coat should be the same red lead paint as the priming coat except that a very small amount of lamp black or carbon black is added to produce a variation in color so that when each successive coat is applied there will be sufficient difference to insure complete covering by the second coat without leaving any unpainted or thin spots. Red lead paint with its natural red color is seldom used for the finishing coat where durability and decorative effect are both important, but one of the most satisfactory and durable finishes is obtained with red lead paint by adding sufficient carbon black to produce a dark brown color or by adding carbon black and Prussian blue to give a black color. A light brown second coat may be obtained by the use of about 0.2 per cent of black pigment, and the dark brown finishing coat contains about 1.3 per cent of black pigment, the remainder of the pigment being red lead.

A black finishing coat is made with a pigment mixture consisting of about 80.5 per cent of red lead, 11.5 per cent black pigment, and 8 per cent Prussian blue. Other black finishing coats, some of which contain graphite, are sometimes used. Frequently light colors such as white and light or medium gray are desired for the finishing coat, particularly for highway structures where high reflection of light is required to make such structures readily visible both in the daytime and under automobile headlight illumination at night. Such white and light colored finishing coats are made with white base pigments which, as mentioned, include white lead, titanium-barium pigment, titanium oxide, zinc oxide, and basic lead sulphate. The addition of the tinting colors gives the desired shade.

A standard formula for light colored finishing coats of this kind is made with white lead and consists of 100 lb. of heavy paste white lead in oil thinned with 3 gal. of raw linseed oil, 1 qt. of turpentine, and 1 pt. of drier, or 100 lb. of all-purpose soft paste white lead in oil, thinned with 3 gal. of raw linseed oil and 1 pt. of drier with the necessary tinting materials.

Nearly all of the structural steel used in building construction today is either surrounded by brick or stone or incased in concrete. It is important that this steel be well painted at the time of erection because after the building has been compleed it is usually impossible to again get at the steel surface for repainting or repair. While brick and concrete afford considerable protection against the elements, neither is waterproof. Brick is porous and may absorb much moisture during wet weather. Concrete lacks uniformity and vibration weakens its internal structure so that moisture is allowed to penetrate. Steel incased in brick, stone, or concrete must therefore be painted with special care to prevent its later corrosion and destruction.

The steel frames of buildings should receive at least three coats of the best paint, and as there is no question of decorative finish involved, it is generally considered good practice to apply three coats of red lead paint, adding slightly increasing amounts of lamp black or carbon black for the second and third coats so as to insure complete covering of the preceding coat. A standard red lead paint, as described for bridges, is generally used for the frames of steel buildings and all coats should be made in accordance with the full weight formula using 33 lb. of red lead to 1 gal. of linseed oil with a small amount of drier. Three coats of such paint will give the greatest protection against corrosion, and every precaution should be taken in selecting and applying the paint because the painting is only done once, and its cost is very small in comparison with the cost of the building it must protect.

Steel Ships

The painting of steel ships for protection consists first in work done while the vessel is building. This involves thorough painting of the steel frames, followed by the painting of the steel plates which form the outer shell and the later painting of the various tanks and other minor metal parts.

In the better class of such work two full coats of red lead paint are applied, generally with a month's interval between coats for drying, and then two coats of white or light gray

paint are put on before the final varnishing and other finishing. Steel ships have a very long life, and the first paint applied on new ships is of the greatest importance. The priming coat on steel ships is similar to the priming coat for other steel structures, and the practice described for bridges is equally applicable to ships.

The main difference between ships and other steel structures is that the hulls of ships are immersed in water after launching, and for this reason the paint should be applied sufficiently far in advance so that it will be completely dry and hard before it comes in contact with the water. For the exterior of the hull below the water line, special anti-fouling paints containing toxic ingredients to prevent marine growth are applied over the red lead paint. The portion along the water line is frequently finished with special "boot-topping" paint, and the upper portions of the hull and superstructure are finished with white or light gray paint similar to the finishing coats for bridges. The interior surfaces may be primed with red lead paint and finished with light colored interior paints and enamels to give the desired decorative appearance. Salt water ships, and bridges located near the seashore, are particularly subject to corrosion, and therefore frequent inspection and repainting are advised.

Painting Automobiles

The finishing of modern automobiles has become an exceedingly technical operation in which coating materials and methods of application are highly specialized. Automobile bodies consist almost entirely of sheet steel, so that automobile finishing is really an important matter in the steel industry. Nitro-cellulose lacquers are used nearly always for the finishes, but usually they are applied over special priming coats and not on the bare metal. The priming coats for automobile bodies most frequently are special enamels which adhere to the steel and dry with a semi-gloss hard finish which can be rubbed and polished to an exceedingly smooth surface suitable for receiving the lacquer finishing coats.

In high grade automobile finishes a number of coats of nitro-cellulose lacquer are applied over the special primers with the necessary colored pigments added to the lacquer to give the color desired in each particular case. The priming coats may be applied by spraying, and the lacquer coats are always sprayed on because the lacquer solutions dry rapidly and it is not possible to brush them.

Tanks

Steel tanks and similar equipment such as standpipes, penstocks and pipe lines are used for many different purposes. Where such equipment is used for holding water, the painting of the exterior does not differ from the painting of other steel structures, and the same general procedure may be followed as described for painting bridges. The painting of the interior of tanks containing water is a special problem because after the paint comes in contact with the water, the air drying can no longer take place, and the paint should be thoroughly dry and hard before the water is admitted.

The interior of all industrial tanks and pipe lines which are to contain water should receive three coats of full weight red lead paint containing 33 lb. of red lead to 1 gal. of oil, with the necessary drier with or without a small amount of volatile thinner, and to hasten the hardening of the paint 2 lb. of finely pulverized litharge should be added to each gallon of paint just before it is applied. Litharge reacts quickly with linseed oil, and paint containing a small amount of litharge forms a hard, elastic film which matures more rapidly than paint to which litharge has not been added. It is well to use highly oxidized red lead when adding powdered litharge, because the litharge is then more completely reactive.

For tanks which are to be used for the storage of volatile liquids such as gasoline, a special problem is involved because it is essential to coat the exterior of such tanks with paint which reflects the heat of the sun to a maximum degree. White paint has a higher coefficient of heat reflection than any tinted or colored paint, and for this reason white paint is the most efficient coating to use for storage tanks of this kind. It must be remembered, however, that the white paint must remain white because if it becomes badly discolored by dirt collection or other causes, it loses its ability to reflect heat. Perhaps the most satisfactory finishing coat for tanks which are to be used for the storage of volatile liquids is white paint which begins to chalk fairly soon after application and continues to chalk throughout its life, because slow continuous chalking causes dirt to wash off with the loose chalking particles and therefore is the only practical method of keeping such surfaces clean and white. Special finishing coat white paints are designed for this purpose, using pigment and vehicle formulas which dry with little or no gloss and begin to chalk within a few weeks.

The right kind of a paint job would have protected these steel tie rods.

While much of the tonnage production of iron, steel and other metals is included in the major classes of metal structures and metal products, there are innumerable metal products of different kinds such as stationary machinery, farm machinery, architectural metal work, barrels, drums, plain and corrugated sheet steel, galvanized sheet, metal containers of different kinds, and all of the many metal products which are technically and commercially important. Many of these different metal products require special treatment which will be considered in some future articles in this series. Porcelain enamel has not been mentioned here because it involves a coating well differentiated from coatings of paint and enamel. It will form the subject of one or more future articles.

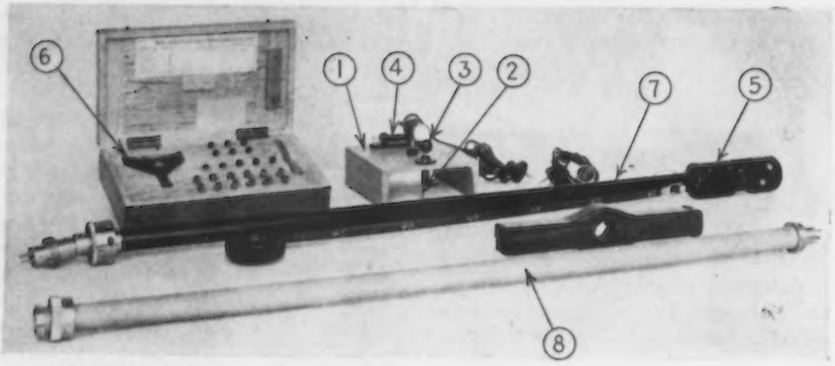


Fig. 1—Outside and inside measuring units or targets furnish the objectives upon which the observation telescopes are sighted.

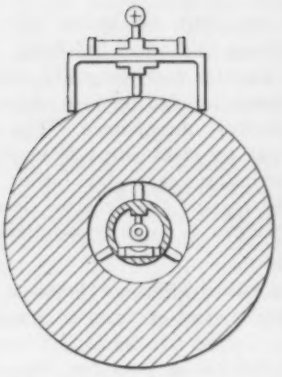


Fig. 3—Schematic layout of the measuring devices for sighting targets in position.

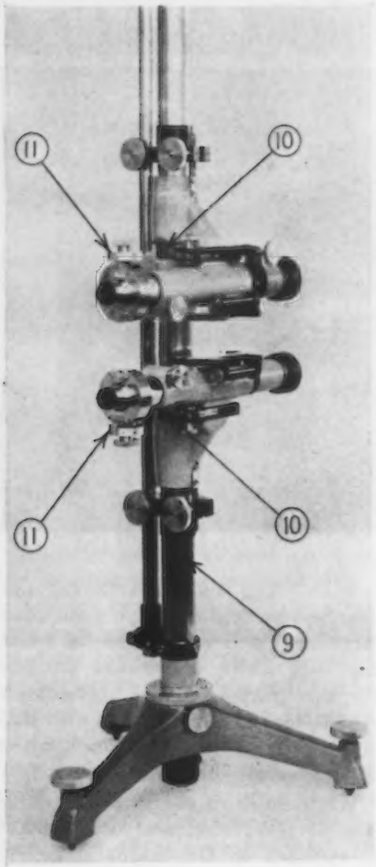


Fig. 2—The telescopes of the cathetometer are provided with fine vertical adjustment and micrometer measuring devices.

Determining Shaft Bo by Cathe to

By RENE LEONHARDT
Consulting Engineer, Berlin

OF the many tests to which highly stressed hollow shafts, especially turbine shafts, are submitted, one worthy of special attention is the checking of the concentric alinement of bores.

In the case of turbines, for instance, an unequal thickness between inside and outside diameter, caused by an eccentric bore, may easily prove disastrous on account of the extraordinary forces applied. In the same manner in which short, hollow shafts with a large diameter may be examined for cracks, scratches, rusty spots, pipes, etc., by means of comparatively simple equipment, one may also detect disalinements of bores in such objects by simple mechanical means. However, in case the objects to be examined are long and of small diameter there arise several difficulties which necessitate the use of some special appliance.

In the manufacturing of turbines, tests of this kind are of special importance. For this industrial branch, therefore, optical equipment has been developed which enables the abovementioned requirements to be filled without further complications. The method employed is based upon an examination of the thickness between inside and outside diameter, carried out in such a manner that the distance is measured between corresponding points of the inside and outside surfaces. For the better understanding of this method it is proposed that a brief description of the apparatus used be given first.

Measuring Equipment

The equipment developed for the determination of misalinements of bores in hollow shafts consists of two separate units, one of which serves to determine the outside diameter of the shaft, and the other to measure the diameter of the bore. These two measuring units are shown in Fig. 1. For the measurements on the circumference a U-shaped rest (1) is used, equipped with a feeler (2) marked by a cross (3). This feeler, illuminated by a lamp, moves in a guide and contacts by its own weight with the object to be tested. In order to ascertain that the feeler always touches the highest point of the object, the U-shaped rest is equipped with a precision level (4) for horizontal adjustment. The bore is measured by a similar feeler pressed against the internal surface. This feeler, which is also cross-marked, is mounted in the head (5) of a tubular body (7) and, out of use, is pressed inside the head. The exact vertical position of the feeler is here, too, adjusted by an ex-

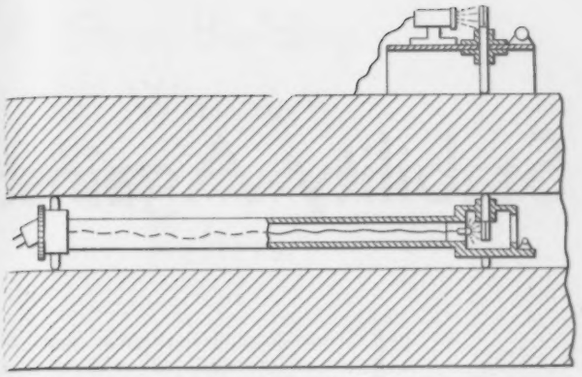
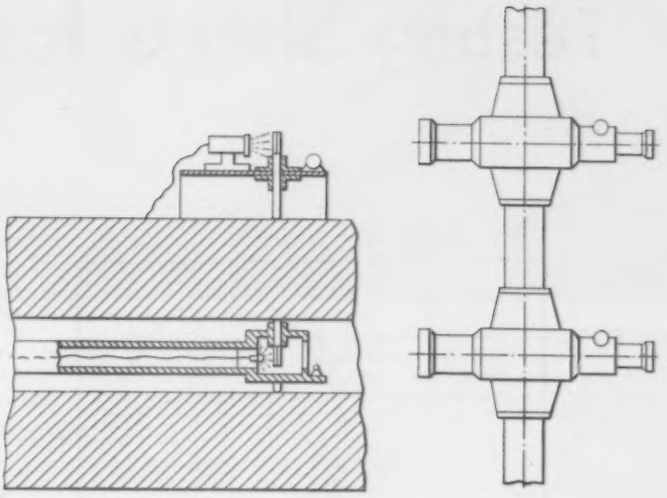


Fig. 4—Sectional view of targets in place showing illumination of cross marks. ▲▲▲

Fig. 5 — Cathetometer telescopes sighted upon the cross marks. ▲▲▲



Bore Alinement tometer

DETERMINATION of misalinement between outer surface and bore of hollow shafts is particularly important in turbine or other rotating shafts. The author described an optical method of measurement, based upon the use of the cathometer, which is applicable to bores of any length.

tremely accurate level located on the head. A centering device permits the tubular body to be held exactly in the center of the bore. By means of a special scale and a knurled ring, the centering device may be adjusted for bores of different diameters. A special gage, depth-gage (6), is used for the measurement of the adjustment.

In case hollow shafts with specially large diameters are to be tested, the pins may be exchanged for larger ones. Special extension rods (8) to be screwed on the tubular body (7) make the apparatus adaptable to objects of any length. A measuring tape fastened to the tubular body serves to indicate the particular position of the feeler inside the bore, and enables the feelers of both the internal and external measuring device to be placed always exactly opposite each other.

Procedure in Measuring

The measurement proper is carried out in the following manner: The shaft to be tested is supported in a horizontal, or rather approximately horizontal, position. An accurate horizontal adjustment is not essential, because the sole objective is the determination of the difference in height of the two cross-marks, or targets, which immediately yields the thickness between inside and outside diameter. First, at one end of the shaft a cathetometer (shown in Fig. 2), equipped with two observation-telescopes and eye-piece micrometer, is mounted as closely as possible in front of the bore. After having set the horizontally adjusted rest (1) on top of the shaft, the cross-mark of the feeler in the U-shaped rest is sighted by the upper telescope of the cathetometer, which is accurately adjusted vertically.

After taking the reading for the mark—full millimeters are read from the vernier (10) and fractions from the drum (11)—the internal measuring device is inserted from the other side. First the feeler is adjusted vertically by means of the level. The cross-mark of this feeler is then sighted by the lower telescope of the cathetometer and the reading taken as described above. In order to give an idea of the accuracy obtainable with this method of measurement, a brief description is presented of the particulars referring to this. As mentioned before, the cathetometer is equipped with reading micrometer, the drums of which are divided into 50 parts. The thread of the drum-spindles has a pitch of 0.25 mm. Thus, one drum interval corresponds to a difference in height of 5/1000 mm. This accuracy, however, is only obtainable if the difference in height to be measured is located within a distance of 20 cm., as naturally its magnified image decreases with increasing distance. Due to this fact, at a distance of 400 cm., the accuracy is about 1/10 mm., this still being sufficiently accurate for the measurement of such large objects.

Shaft is Rotated

After having taken the readings just described, the shaft is turned around

(Concluded on Page 76)

How

METAL products and [illegible] inextricably associated [illegible] better appearance and [illegible] against corrosion, a large [illegible] metal products is painted [illegible] eled, and the very process [illegible] ing, which, in most cases, [illegible] a significant production [illegible] calls for the use of a large [illegible] of metal for equipment [illegible] liary apparatus. Large metal [illegible] closures with elaborate [illegible] systems are used for painting [illegible] trucks, and railway equipment. The manufacture of paint itself calls for a heavy tonnage of metal. In 1931, 100,000 tons of lead and antimony entered into the manufacture of paint, yet the importance of correct technique in painting metal products is still insufficiently understood. In a group of several articles on painting, of which this is the first, some of the important factors involved in the painting of metal and metal products are described.

This series is being prepared under the direction of Mr. Simonds for THE IRON AGE. Mr. Hallett is associated with The National Lead Co.

Painting of structural steel is a vital process in its erection. It is hazardous work and calls for well trained men. Good practice in this field is to use the best available materials, as usually the steel is never painted again after the building has been completed.

▲ ▲ ▲

By R. L. HALLETT and HERBERT R. SIMONDS

SURELY everyone will grant the importance of steel bridges, steel buildings, and steel ships in our present highly developed civilization, but it is not so universally understood that these steel structures, costing vast sums of money, would have short life and could not be successfully built and maintained without the protection of paint. A multiplicity of other important metal products attains greatest value in industry by being painted or enameled, and each year American companies manufacture more than 150,000,000 gallons of paint, varnish, enamel, and lacquer having a value in excess of $200,000,000. While these figures are commercially impressive, they are insignificant in comparison with the importance of the structures which are thus protected and decorated.

The steel and allied industries consume a fairly large proportion of all manufactured paint products, and there is a close bond of mutual advantage between these commodities. Paint finds a good market as a coating for metal, and metal finds a good market in the paint industry. Lead, zinc, antimony, aluminum and other metals are used in paint production. Steel and tin are used for paint containers, and a heavy tonnage of steel and other metal is used each year for such painting equipment as sprays, drying rooms, spray booths, exhaust and blower systems, material handling apparatus, dip tanks, bake ovens and sand blast machines.

The broad term "painting" is used in its generic form to designate the application of decorative and protective coatings, whether they be paint, enamel, lacquer, varnish, or even lithographic coatings. Even technically it is sometimes difficult to differentiate between these different types of coatings, because in character and composition they may merge one into another. However, to be specific, several different types of protective coatings may be briefly defined as follows:

1. *Paint:* Paint is a mixture of opaque pigment with non-volatile oil or vehicle, with or without the addition of volatile thinner. It is applied in the form of a liquid in thin films and after application dries to form hard, tough, elastic coatings. The

Attractive Finish Helps Metal Products Sales

24—Painting

volatile liquid portion of paint ...ng or more of the vegetable drying oils which dry and harden by absorbing oxygen from the air, thus ...nt films dry substantially by oxidation.

In the metal industries, paints have many important uses such as the protection and decoration of steel structures, buildings, ships, ornamental sheet metal and iron work, and many manufactured metal products.

2. *Enamel:* An enamel is similar to a paint, as it is a mixture of opaque pigment with non-volatile vehicle and volatile thinner, but it differs in that the non-volatile vehicle is essentially a varnish which dries and hardens both by oxidation and evaporation of the volatile thinner.

Industrial enamels are extensively used on many kinds of manufactured metal products such as machine tools and other machinery, railroad equipment, sheet metal containers of different kinds, and innumerable smaller metal products.

3. *Lacquer:* At the present time the term "lacquer" is properly used to designate a solution of nitro-cellulose in a volatile solvent with or without opaque pigment. Prior to the introduction of nitro-cellulose lacquer, the term "lacquer" was rather loosely used.

The most important use for lacquer is for finishing modern automobiles, but it is also used on motorcycles, bicycles, metal furniture, and on many specialty metal products.

4. *Varnish:* Varnish is a clear solution of resins in vegetable drying oils, thinned to liquid consistency with volatile solvents. Varnish dries both by oxidation of the oil and evaporation of the volatile thinner.

Clear varnishes are not as important in the metal industries as paint, enamel, and lacquer, but are used to some extent where clear finishes are desired.

5. *Lithographic Coatings:* Lithographic coatings vary greatly in composition and use. Generally speaking, they are enamels which are baked after application and, technically speaking, are any of several coatings applied by printing processes.

Lithographic coatings are used on sheet metal containers of different kinds such as cans and tubes, and wherever small sheet metal articles can be economically handled by printing processes.

Many long steel pipe lines are painted on the inside for protection against the effect of gas or chemicals. The shows a special type of buggy used in painting the inside of a long line 3 ft. in diameter.

A recent development, described earlier in this series under "Prefinished Raw Materials," is the lithographing of steel sheets which are later stamped and formed into the finished article.

Paints and Their Uses

Paints may be classified in different ways; for instance, based on the structures or products on which they are to be used, based on whether they are designed to dry with a gloss or flat finish, or based on whether they are intended for exterior or interior exposure. The non-volatile vehicle of most paints is linseed oil, although other drying oils are used to some extent.

Under one classification, paints may be divided into white and light tints; in another, into dark colors. Light paints are made with a white base, and for durable exterior exposure the white pigments used are white lead, titanium-barium pigment, titanium oxide, zinc oxide, and basic lead sulphate. For interior use where the exposure is less severe, light paints may be made with a white base containing titanium-calcium pigment or lithophone, as well as the other white pigments. For exterior exposure the light paints are usually the finishing coats used to obtain decorative finishes.

The priming coats, which are required to prevent rusting and corrosion of metal, are usually red lead paints containing no white pigments. Blue basic lead sulphate is sometimes used in priming coats for metal surfaces.

Paints which are so dark in color that they cannot contain any white base include not only red lead paint priming coats but also many finish-

ing coat paints where such strong dark colors as yellow, green and black are required. Such dark colored paints are made with the pigments needed to give the desired color, in which case the non-volatile vehicle is linseed oil. Some of these paints contain varnish, and have enamel or semi-enamel characteristics.

Aluminum paint contains no white base, but has a light gray color and might be considered in a special class. Aluminum paint is sometimes used for a finishing coat where its particular color and surface sheen are wanted.

In the classification of paints according to their surface finish, there may be gloss or flat paint, or an intermediate semi-gloss frequently known as "egg-shell" paint. The essential difference between gloss and flat paint is the proportional amount of pigment as compared to the non-volatile vehicle. If the paint contains a high proportion of oil or non-volatile vehicle by volume, the oil will flood the pigment, allowing the pigment particles to recede from the surface, and the paint will dry with a smooth, even, plain surface with high gloss.

If the paint contains a small proportion of oil with volatile thinner added to give brushing consistency, the rapid evaporation of the volatile thinner will leave a coating with insufficient oil to flood the particles of pigment, and the pigment particles will pile up on each other and extend through the surface of the paint in a broken manner resulting in more or less complete diffusion of light reflected from the surface and giving what is known as a "flat" finish.

In addition to the above classification, paints should be selected according to the structures or products on which they are to be applied, and may vary in composition, color and surface finish, according to requirements. As the non-volatile vehicles of paints consist principally of linseed oil and other vegetable drying oils, drying is almost entirely by oxidation, and contact with the air is necessary.

Enamels

What has been said about paints applies almost equally to enamels, as they vary widely in composition, color and character of finish. Popular conception is that enamels dry with a high gloss finish, and this is true of most enamel products, although there are some enamels which dry flat or with an egg-shell finish. It might be said that the principal use for paints is for the exterior or interior surfaces of large permanent structures, whereas the principal use for enamels is for finishing manufactured metal products, although there are exceptions in both cases. Technically speaking, enamels are made with gum or resin varnish vehicles containing some linseed oil or other vegetable drying oils. For this reason enamels dry partly by oxidation and partly by evaporation of the volatile thinner which causes a "set" of the non-volatile portion of the varnish. Enamels are made to dry either by exposure to the air or by baking, depending on the requirements in each individual case.

Lacquers

Lacquers are essentially solutions of nitro-cellulose in certain organic solvents which dissolve the hard nitro-cellulose material to form a liquid which may be applied in thin coatings. If nitro-cellulose alone were used, evaporation of the volatile solvent would leave a hard, brittle coating, and for this reason small amounts of other non-volatile materials known as "softeners" and "plasticizers" are added. Lacquers may be used in the form of clear coatings or with the desired pigments to make opaque coatings of different colors. They dry entirely by evaporation of

All steel bridges are carefully painted first in the shops and then in the field. More than 10,000 lb. of red lead paint was used for the field coats of this railroad bridge. For the field work of the George Washington Bridge more than 36,000 gal. of red lead paint were used.

volatile solvents, leaving the non-volatile portion in the form of a hard

Varnishes

Varnishes are clear liquids consisting of solutions of gums or resins in one or more of the vegetable drying oils thinned with suitable volatile liquids so that the thick, viscous, non-volatile combinations of oil and gum or resin will have the proper liquid consistency for application. Linseed oil and china wood oil are the principal drying oils used in making varnish, although some other oils are utilized to some extent. A generation ago varnishes were largely made with natural fossil gums and resins, but today varnishes are made almost entirely with modified resin compounds such as ester gum and synthetics such as phenol-formaldehyde and glyptal resins. Because the non-volatile portion of varnishes consists of both drying oils and gums or resins, varnishes dry both by oxidation and by evaporation of the volatile thinners. Varnishes are designed to dry either by exposure to the air or by baking, as conditions require.

Lithographic coatings are similar to paints and enamels in composition, and from the point of view of composition they probably should not be considered as in a separate class, but they are generally applied by some printing process, and it is this method of application which has resulted in their designation as lithographic coatings. After application, the coatings are usually baked.

Painting Metal Structures and Metal Products

Paint which will give the greatest satisfaction and lowest upkeep cost on a steel bridge may be equally satisfactory on a viaduct, elevated railway structure, water tank, standpipe, metal cornice, or any one of innumerable other metal surfaces directly exposed to similar weather conditions. The great similarity in the painting of such structures is in the priming coat, which is equally suitable for all of them, and in many cases there is no difference in the body and finishing coats, although the finishes may show wide variations, depending upon the color and effect desired, because it must be remembered that paint is used both for protection and appearance. Metal structures and metal products may be broadly divided into a few major classes where the paint materials used and the methods of application are more or less the same for each class. Here we are considering principally the painting of iron and steel, which are the products used for a vast majority of metal structures and products.

▲ ▲ ▲

In the face of rapid strides toward labor saving operation in most fields, painting of bridges is today practically the same operation as it was 50 years ago. There has been a remarkable improvement in materials, but practically none in method of applying them. This shows the maintenance painting of Brooklyn Bridge, a process which has been going ahead almost constantly during half a century.

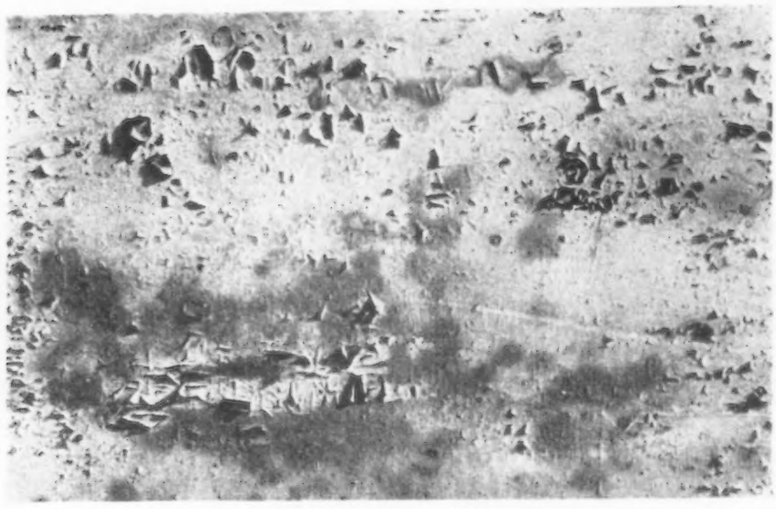
▼ ▼ ▼

Steel Bridges

This class includes fabricated steel structures such as railroad and highway bridges, viaducts and elevated railway systems. The first and most important painting problem is the priming coat on the bare metal, which must be relied on to protect the metal against corrosion and to furnish a suitable foundation for the subsequent coatings of paint. It is generally considered standard practice by the large railroads, highway departments, and fabricators of steel structures to use red lead paint for the priming coat next to the metal. This is made with pure red lead pigment and linseed oil with a small amount of drier and with or without a small amount of volatile thinner. It would seem that this is a simple formula, but many variations are possible in the kind and character of red lead used, and in the proportions of red lead and linseed oil. Some kinds of red lead are better than others, and the proportions of red lead and linseed oil must be kept within fairly narrow limits if the best results are to be obtained.

Red lead is made by a furnace treatment of litharge, which is the lower oxide of lead, and in this treatment the litharge is further oxidized to the higher oxide form, and the red color is developed. The extent to which this further oxidation takes place in the manufacture of red lead determines the character and usefulness of the red lead to a marked degree. There are really three distinct grades of red lead used for paint purposes which are classified in accordance with their degree of oxidation and are designated as 85 per cent, 95 per cent, and 97 per cent red lead, which means that they contain these percentages of true red lead, or, in other words, the litharge has been oxidized to an extent corresponding to these percentages. The 85 per cent grade is usually coarser than the more highly oxidized material and contains a considerable amount of unoxidized litharge which is not desirable for the best red lead paint.

The most satisfactory red lead pigment for iron and steel paint is the



For adequate protection and continuing good appearance, steel must be properly prepared and the right kind of paint must be used. This shows what happens after less than a year's weathering of a poor paint job.

97 per cent grade with uniformly fine particles. Many scientific tests and long practical experience have demonstrated that this highly oxidized red lead produces paint films on iron and steel which have durability and which protect the metal against corrosion for a great length of time. Even if the best grade of red lead is used, the most satisfactory paint will not result unless the red lead and oil are properly proportioned.

A satisfactory red lead paint for the priming coat on iron and steel is a mixture consisting of 33 lb. of red lead to 1 gal. of linseed oil. If raw linseed oil is used, a small amount of drier must be added, but if boiled linseed oil, or a mixture of boiled linseed oil and raw linseed oil is used, drier is not required because sufficient drier is contained in properly made boiled linseed oil. Considerable red lead paint of somewhat lighter formula than 33 lb. to the gallon of linseed oil is used on steel structures, but for the best results the paint should contain not less than 28 lb. of red lead to 1 gal. of linseed oil.

At least three coats of paint should be applied on a new steel structure, and the second or body coat should be the same red lead paint as the priming coat except that a very small amount of lamp black or carbon black is added to produce a variation in color so that when each successive coat is applied there will be sufficient difference to insure complete covering by the second coat without leaving any unpainted or thin spots. Red lead paint with its natural red color is seldom used for the finishing coat where durability and decorative effect are both important, but one of the most satisfactory and durable finishes is obtained with red lead paint by adding sufficient carbon black to produce a dark brown color or by adding carbon black and Prussian blue to give a black color. A light brown second coat may be obtained by the use of about 0.2 per cent of black pigment, and the dark brown finishing coat contains about 1.3 per cent of black pigment, the remainder of the pigment being red lead.

A black finishing coat is made with a pigment mixture consisting of about 80.5 per cent of red lead, 11.5 per cent black pigment, and 8 per cent Prussian blue. Other black finishing coats, some of which contain graphite, are sometimes used. Frequently light colors such as white and light or medium gray are desired for the finishing coat, particularly for highway structures where high reflection of light is required to make such structures readily visible both in the daytime and under automobile headlight illumination at night. Such white and light colored finishing coats are made with white base pigments which, as mentioned, include white lead, titanium-barium pigment, titanium oxide, zinc oxide, and basic lead sulphate. The addition of the tinting colors gives the desired shade.

A standard formula for light colored finishing coats of this kind is made with white lead and consists of 100 lb. of heavy paste white lead in oil thinned with 3 gal. of raw linseed oil, 1 qt. of turpentine, and 1 pt. of drier, or 100 lb. of all-purpose soft paste white lead in oil, thinned with 3 gal. of raw linseed oil and 1 pt. of drier with the necessary tinting materials.

Nearly all of the structural steel used in building construction today is either surrounded by brick or stone or incased in concrete. It is important that this steel be well painted at the time of erection because after the building has been completed it is usually impossible to again get at the steel surface for repainting or repair. While brick and concrete afford considerable protection against the elements, neither is waterproof. Brick is porous and may absorb much moisture during wet weather. Concrete lacks uniformity and vibration weakens its internal structure so that moisture is allowed to penetrate. Steel incased in brick, stone, or concrete must therefore be painted with special care to prevent its later corrosion and destruction.

The steel frames of buildings should receive at least three coats of the best paint, and as there is no question of decorative finish involved, it is generally considered good practice to apply three coats of red lead paint, adding slightly increasing amounts of lamp black or carbon black for the second and third coats so as to insure complete covering of the preceding coat. A standard red lead paint, as described for bridges, is generally used for the frames of steel buildings and all coats should be made in accordance with the full weight formula using 33 lb. of red lead to 1 gal. of linseed oil with a small amount of drier. Three coats of such paint will give the greatest protection against corrosion, and every precaution should be taken in selecting and applying the paint because the painting is only done once, and its cost is very small in comparison with the cost of the building it must protect.

Steel Ships

The painting of steel ships for protection consists first in work done while the vessel is building. This involves thorough painting of the steel frames, followed by the painting of the steel plates which form the outer shell and the later painting of the various tanks and other minor metal parts.

In the better class of such work two full coats of red lead paint are applied, generally with a month's interval between coats for drying, and then two coats of white or light gray

...nt are put on before the final ...rnishing and other finishing. Steel ...ps have a very long life, and the ... paint applied on new ships is of ... greatest importance. The prim... coat on steel ships is similar to ... priming coat for other steel ...ctures, and the practice described ... bridges is equally applicable to ...ps.

The main difference between ships ... other steel structures is that the ...ls of ships are immersed in water ... launching, and for this reason ... paint should be applied sufficiently ... in advance so that it will be com...ely dry and hard before it comes ... contact with the water. For the ...erior of the hull below the water ... special anti-fouling paints con...ing toxic ingredients to prevent ...rine growth are applied over the ... lead paint. The portion along the ...ter line is frequently finished with ...cial "boot-topping" paint, and the ...per portions of the hull and super...cture are finished with white or ...ht gray paint similar to the finish...g coats for bridges. The interior ...faces may be primed with red lead ...int and finished with light colored ...erior paints and enamels to give ... desired decorative appearance. ...lt water ships, and bridges located ...r the seashore, are particularly ...ject to corrosion, and therefore ...quent inspection and repainting ... advised.

Painting Automobiles

The finishing of modern automo...les has become an exceedingly tech...al operation in which coating ma...ials and methods of application are ...ghly specialized. Automobile bodies ...sist almost entirely of sheet steel, ... that automobile finishing is really ... important matter in the steel ...dustry. Nitro-cellulose lacquers are ...ed nearly always for the finishes, ...t usually they are applied over ...pecial priming coats and not on the ...re metal. The priming coats for ...tomobile bodies most frequently are ...pecial enamels which adhere to the ...eel and dry with a semi-gloss hard ...nish which can be rubbed and pol...hed to an exceedingly smooth sur...ace suitable for receiving the lacquer ...nishing coats.

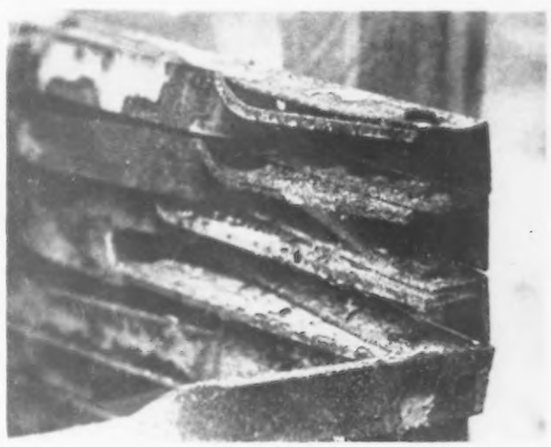
In high grade automobile finishes a ...mber of coats of nitro-cellulose lac...uer are applied over the special ...primers with the necessary colored ...pigments added to the lacquer to give ... color desired in each particular ...ase. The priming coats may be ap...lied by spraying, and the lacquer ...oats are always sprayed on because ...the lacquer solutions dry rapidly and it is not possible to brush them.

Tanks

Steel tanks and similar equipment such as standpipes, penstocks and pipe lines are used for many different purposes. Where such equipment is used for holding water, the painting of the exterior does not differ from the painting of other steel structures, and the same general procedure may be followed as described for painting bridges. The painting of the interior of tanks containing water is a special problem because after the paint comes in contact with the water, the air drying can no longer take place, and the paint should be thoroughly dry and hard before the water is admitted.

The interior of all industrial tanks and pipe lines which are to contain water should receive three coats of full weight red lead paint containing 33 lb. of red lead to 1 gal. of oil, with the necessary drier with or without a small amount of volatile thinner, and to hasten the hardening of the paint 2 lb. of finely pulverized litharge should be added to each gallon of paint just before it is applied. Litharge reacts quickly with linseed oil, and paint containing a small amount of litharge forms a hard, elastic film which matures more rapidly than paint to which litharge has not been added. It is well to use highly oxidized red lead when adding powdered litharge, because the litharge is then more completely reactive.

For tanks which are to be used for the storage of volatile liquids such as gasoline, a special problem is involved because it is essential to coat the exterior of such tanks with paint which reflects the heat of the sun to a maximum degree. White paint has a higher coefficient of heat reflection than any tinted or colored paint, and for this reason white paint is the most efficient coating to use for storage tanks of this kind. It must be remembered, however, that the white paint must remain white because if it becomes badly discolored by dirt collection or other causes, it loses its ability to reflect heat. Perhaps the most satisfactory finishing coat for tanks which are to be used for the storage of volatile liquids is white paint which begins to chalk fairly soon after application and continues to chalk throughout its life, because slow continuous chalking causes dirt to wash off with the loose chalking particles and therefore is the only practical method of keeping such surfaces clean and white. Special finishing coat white paints are designed for this purpose, using pigment and vehicle formulas which dry with little or no gloss and begin to chalk within a few weeks.



The right kind of a paint job would have protected these steel tie rods

While much of the tonnage production of iron, steel and other metals is included in the major classes of metal structures and metal products, there are innumerable metal products of different kinds such as stationary machinery, farm machinery, architectural metal work, barrels, drums, plain and corrugated sheet steel, galvanized sheet, metal containers of different kinds, and all of the many metal products which are technically and commercially important. Many of these different metal products require special treatment which will be considered in some future articles in this series. Porcelain enamel has not been mentioned here because it involves a coating well differentiated from coatings of paint and enamel. It will form the subject of one or more future articles.

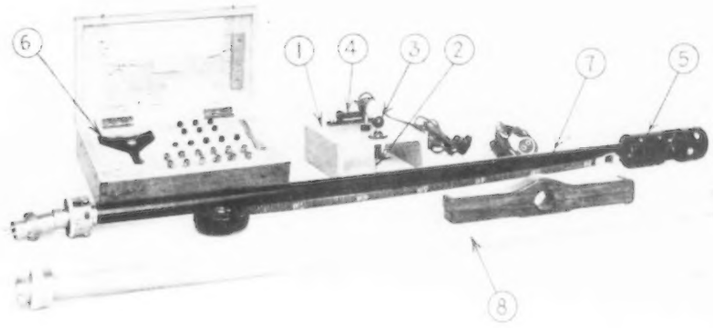


Fig. 1—Outside and inside measuring units or targets furnish the objectives upon which the observation telescopes are sighted

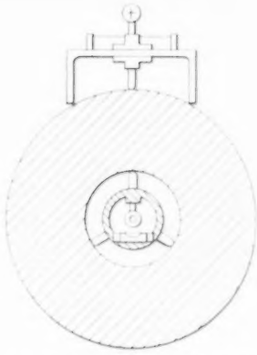


Fig. 3—Schematic layout of the measuring devices for sighting targets in position

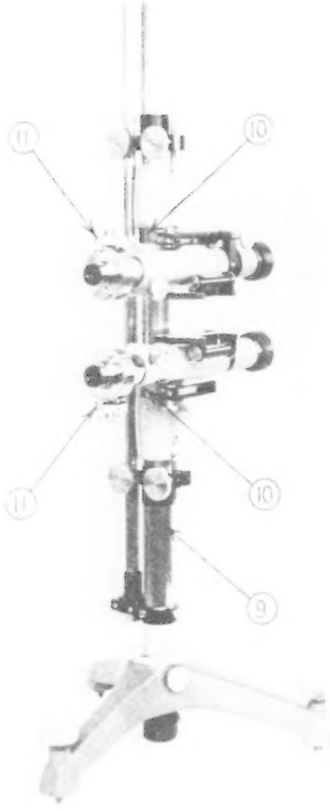


Fig. 2—The telescopes of the cathetometer are provided with fine vertical adjustment and micrometer measuring devices

Determining Shaft by Cathe

By RENE LEONHARDT
Consulting Engineer, Berlin

OF the many tests to which highly stressed hollow shafts, especially turbine shafts, are submitted, one worthy of special attention is the checking of the concentric alinement of bores.

In the case of turbines, for instance, an unequal thickness between inside and outside diameter, caused by an eccentric bore, may easily prove disastrous on account of the extraordinary forces applied. In the same manner in which short, hollow shafts with a large diameter may be examined for cracks, scratches, rusty spots, pipes, etc., by means of comparatively simple equipment, one may also detect disalinements of bores in such objects by simple mechanical means. However, in case the objects to be examined are long and of small diameter there arise several difficulties which necessitate the use of some special appliance.

In the manufacturing of turbines, tests of this kind are of special importance. For this industrial branch, therefore, optical equipment has been developed which enables the above-mentioned requirements to be filled without further complications. The method employed is based upon an examination of the thickness between inside and outside diameter, carried out in such a manner that the distance is measured between corresponding points of the inside and outside surfaces. For the better understanding of this method it is proposed that a brief description of the apparatus used be given first.

Measuring Equipment

The equipment developed for the determination of misalinements of bores in hollow shafts consists of two separate units, one of which serves to determine the outside diameter of the shaft, and the other to measure the diameter of the bore. These two measuring units are shown in Fig. 1. For the measurements on the circumference a U-shaped rest (1) is used, equipped with a feeler (2) marked by a cross (3). This feeler, illuminated by a lamp, moves in a guide and contacts by its own weight with the object to be tested. In order to ascertain that the feeler always touches the highest point of the object, the U-shaped rest is equipped with a precision level (4) for horizontal adjustment. The bore is measured by a similar feeler pressed against the internal surface. This feeler, which is also cross-marked, is mounted in the head (5) of a tubular body (7) and, out of use, is pressed inside the head. The exact vertical position of the feeler is here, too, adjusted by an ex-

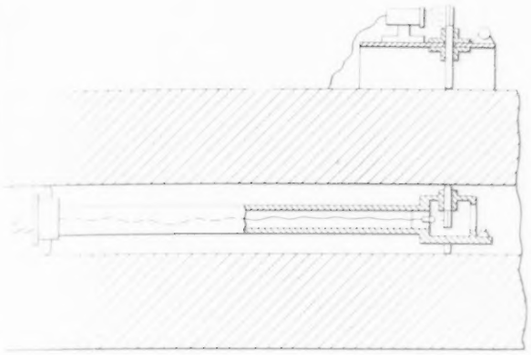


Fig. 4—Sectional view of targets in place showing illumination of cross marks.

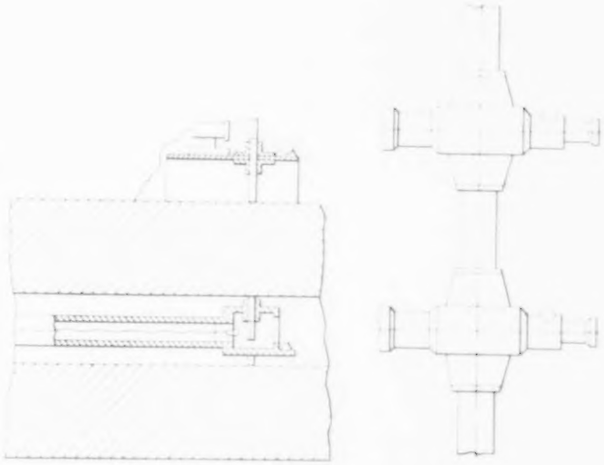


Fig. 5 — Cathetometer telescopes sighted upon the cross marks

Bore Alinement tometer

DETERMINATION of misalinement between outer surface and bore of hollow shafts is particularly important in turbine or other rotating shafts. The author described an optical method of measurement, based upon the use of the cathometer, which is applicable to bores of any length.

finely accurate level located on the ead. A centering device permits the ular body to be held exactly in the nter of the bore. By means of a ecial scale and a knurled ring, the ntering device may be adjusted for res of different diameters. A spe- al gage, depth-gage (6), is used for e measurement of the adjustment.

In case hollow shafts with specially rge diameters are to be tested, the ins may be exchanged for larger ones. Special extension rods (8) to be screwed on the tubular body (7) make the apparatus adaptable to objects of any length. A measuring tape fastened to the tubular body serves to indicate the particular position of the feeler inside the bore, and enables the feelers of both the internal and external measuring device to be placed always exactly opposite each other.

Procedure in Measuring

The measurement proper is carried out in the following manner: The shaft to be tested is supported in a horizontal, or rather approximately horizontal, position. An accurate horizontal adjustment is not essential, because the sole objective is the determination of the difference in height of the two cross-marks, or targets, which immediately yields the thickness between inside and outside diameter. First, at one end of the shaft a cathetometer (shown in Fig. 2), equipped with two observation-telescopes and eye-piece micrometer, is mounted as closely as possible in front of the bore. After having set the horizontally adjusted rest (1) on top of the shaft, the cross-mark of the feeler in the U-shaped rest is sighted by the upper telescope of the cathetometer, which is accurately adjusted vertically.

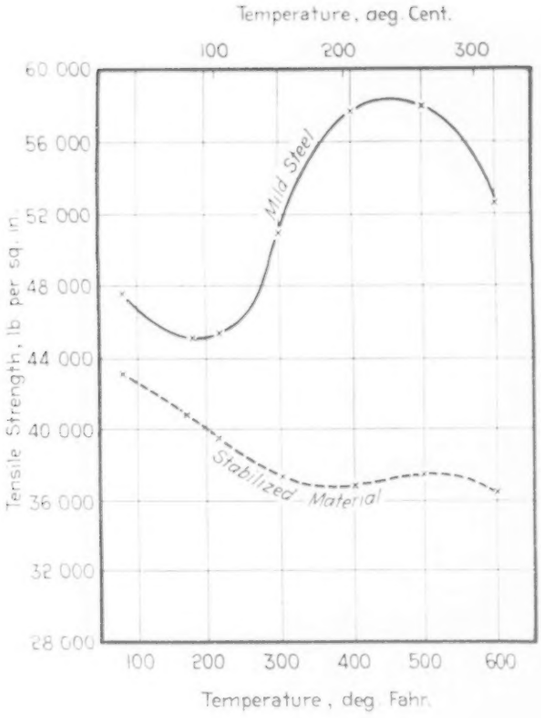
After taking the reading for the mark—full millimeters are read from the vernier (10) and fractions from the drum (11)—the internal measuring device is inserted from the other side. First the feeler is adjusted vertically by means of the level. The cross-mark of this feeler is then sighted by the lower telescope of the cathetometer and the reading taken as described above. In order to give an idea of the accuracy obtainable with this method of measurement, a brief description is presented of the particulars referring to this. As mentioned before, the cathetometer is equipped with reading micrometer, the drums of which are divided into 50 parts. The thread of the drum-spindles has a pitch of 0.25 mm. Thus, one drum interval corresponds to a difference in height of 5/1000 mm. This accuracy, however, is only obtainable if the difference in height to be measured is located within a distance of 20 cm., as naturally its magnified image decreases with increasing distance. Due to this fact, at a distance of 400 cm., the accuracy is about 1/10 mm., this still being sufficiently accurate for the measurement of such large objects.

Shaft is Rotated

After having taken the readings just described, the shaft is turned around

(Concluded on Page 76)

Testing Sheets for Stability Against

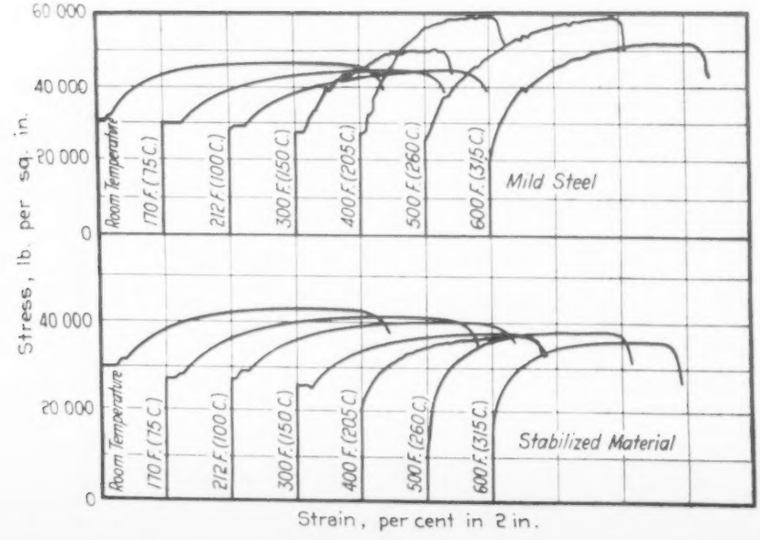


AT LEFT

Fig. 1 — Effect of testing temperature on tensile strength of mild steel and new stabilized steel sheets.

BELOW

Fig. 2—Stress-strain curves of mild steel and new stabilized steel tested at various temperatures.



IT has long been known that the tensile strength of mild steel is greater at slightly elevated temperature than at room temperature. F. Fettweiss, *Stahl und Eisen*, Jan. 2 and 9, 1919, was perhaps the first to point out the connection between this behavior and the changes in properties due to aging. The rate at which the changes due to aging take place depends largely upon the aging temperature, other things being constant. The maximum tensile strength of mild steel occurs at about 570 F. (300 C.), although its exact location depends on the speed of testing.

There is now no doubt about the relationship between aging and blue brittleness. It is, therefore, entirely feasible to use a test for blue brittleness as a measure of the stability of the material against changes due to aging. The principal advantage of this lies in the elimination of a number of variables that have to be controlled in the case of aging tests.

In aging tests, it is necessary to cold-work the material a definite amount, and then hold for a definite length of time at a certain temperature. Each of these variables—amount of cold work, time and temperature of aging—greatly influences the final results. Some materials change faster than others, therefore, the arbitrary selection of a particular time and temperature makes it difficult to compare the results obtained on different materials.

In the case of the tests for blue brittleness, the difference in the physical properties at room temperature and in the blue-brittle range furnish the criterion. It is only necessary then to establish a quantitative relationship between the two tests.

With thin sheets there are many difficulties encountered in making, at elevated temperatures, even such a well-standardized test as the static tension test. The chief difficulties include: The method of heating the specimen uniformly in a manner to prevent excessive oxidation of the thin

Supervising Research Engineer and Research Engineer, respectively, American Rolling Mill Co., Middletown, Ohio.

Aging Under Strain

By R. L. KENYON[1] and R. S. BURNS[2]

grip; measurement of the actual temperature of the specimen; gripping the specimen; and providing an autographic extensometer so that stress-strain curves can be drawn. Thus far we have been successful in making tension tests on thin strips (as thin as 0.015 in.) at temperatures up to about 600 F. (315 C.). The upper temperature limit depends largely on the flash point of the oil used in the heating pot.

The apparatus was designed for use in an Amsler testing machine. The sample is held in special grips. An oil bath is used for heating the specimens, because it lends itself to closer temperature control than a vertical tube furnace and the specimens are brought to temperature more quickly. The construction of the pot is quite simple. It consists of a brass shell insulated with mica and wound with a nichrome heating element which is covered on the outside with asbestos insulation 1 in. thick. An iron-constantan thermocouple is silver-soldered to the inside of the brass shell about halfway up the side, and this is connected to a Leeds & Northrup potentiometer recorder-controller for regulating the pot temperature. A small stirring motor keeps the oil rapidly circulating and so minimizes the temperature gradient from the outer shell to the specimen in the center.

In order to obtain satisfactory results in any method of testing, it is necessary that the proper technique be followed; this is especially true in the case of tension tests at elevated temperatures. In making these tests, it is quite necessary always to use the same testing speed because the tensile properties are much more influenced by this variable at elevated temperature than at room temperature. All of the tests reported here were made with a machine cross-head speed equivalent to a rate of strain of 0.05 in. per in. per min. below the yield point, and 0.20 in. per inch of gage length per minute above the yield point. It is also true that the testing temperature must be very carefully controlled and kept uniform over the entire specimen.

The solid line in Fig. 1 shows the results of tests on No. 19-gage mild steel deep-drawing sheets for automobile bodies. The strength is slightly less at 170 and 212 F. (75 and 100 C.) than at room temperature, but

IN connection with the development by the American Rolling Mill Co. of a sheet for deep drawing purposes that is free from aging effects, the author applied the principle that strain aging and blue brittleness of ferrous materials are but different manifestations of the same phenomenon. They determined the tensile strength at room temperatures and at a temperature in the blue brittleness range. The difference was correlated with the change in tensile properties resulting from an artificial aging treatment.

at 300, 400, 500 and 600 F. (150, 205, 260 and 315 C.) it is above that at room temperature. There is a maximum between 400 and 500 F. (205 and 260 C.). This differs from the maximum reported by LeChatelier and Fettweiss (300 C., 570 F.), but, as mentioned by the latter, this is caused by difference in testing speed.

The stress-strain curves for this material, made at various temperatures, are shown in the upper part of Fig. 2. Those made at 300 F. (150 C.) and higher show numerous irregularities; this is most prominent at 400 F. (205 C.). These are believed to be due to the intermittent plastic deformation and age-hardening of the specimen during the test. The first deformation causes aging and concomitant hardening of the portion that has deformed. The specimen can then support a greater load than before and the curve rises until a load is reached that is sufficient to produce deformation at some other point. These deformations take place rapidly and the load drops off momentarily because of the inertia of the moving parts of the testing machine. The result is a series of "yield points" until the specimen finally breaks.

Under the test conditions described, the blue-brittle characteristics are most pronounced at 400 F. (205 C.), and so that testing temperature was selected for determining the properties in the blue-brittle range. The "blue-brittle" test, as the term is used here, consists in determining the tensile properties at room temperature and at 400 F. (205 C.). The differences between the tensile strength at room temperature and that at 400 F. (205 C.) and the roughness of the stress-strain curve are measures of the degree of blue brittleness.

Up to the present time there has been no ferrous material with physical properties completely stabilized against changes due to aging; therefore, it has been impossible for scientific workers to determine the effect of temperature on the tensile strength of such metals when they were free from blue brittleness. The development of a completely stabilized mild steel sheet material for deep-drawing purposes (THE IRON AGE, July 13, 1933, p. 27.) offers an opportunity for such a study.

The dashed line in Fig. 1 shows the results of tension tests at elevated temperature on the stabilized steel sheet and it will be seen that there is no increase in strength above that at room temperature; as a matter of fact, the strength decreases continuously with rising temperature in the same manner as many non-ferrous materials, which, as is well known, are free from the objectionable phenomena of blue brittleness and instability. The stress-strain curves of this stabilized material tested at various testing temperatures are shown in the lower part of Fig. 2, and it will be observed that they are quite free from irregularities at all temperatures.

Those changes in properties which would affect the drawing qualities

Table 1—Blue-brittle and aging tests on 10 materials with varying degrees of stability.[a]

Material	Blue-Brittle Tests			Aging Tests					
	Tensile Strength, lb. per sq. in.			Tensile Strength, lb. per sq. in.			Elongation in 2 in., per cent		
	At Room Temperature	At 400 F. 205 C.)	Difference, 400 F. (205 C.) to Room Temperature	Fresh	3 Hours at 212 F. (100 C.)	Difference	Fresh	3 Hours at 212 F. (100 C.)	Difference
No. 1	57 575	71 150	+13 575	60 300	64 600	+4300	24 25	17 25	−7 00
No. 2	47 575	58 200	+10 625	49 100	53 700	+4600	31 75	24 50	−7 25
No. 3	47 950	57 050	+9 100	49 700	53 125	+3425	31 25	22 75	−8 50
No. 4	41 000	42 075	+1 075	41 375	42 250	+875	40 00	37 25	−2 75
No. 5	44 390	44 200	−190	46 100	46 425	+325	38 75	37 25	−1 50
No. 6	43 450	42 800	−650	44 275	44 275	0	35 75	33 25	−2 50
No. 7	42 800	41 425	−1 375	42 650	42 675	+25	39 50	39 50	0
No. 8	59 200	53 400	−5 300	61 975	61 225	−750	29 75	30 25	+0 60
No. 9	45 300	37 725	−7 575	46 375	46 075	−300	39 00	38 75	−0 25
No. 10.	57 650	48 225	−9 425	61 725	60 950	−775	32 50	32 50	0

[a] Each value shown is an average of two determinations. These two determinations differed probably from chance causes since the specimens were carefully selected to be alike as far as anyone knew. The average, maximum, and minimum differences between duplicate specimens were as follows:

	Blue-Brittle Tests		Aging Tests			
	Room Temperature	400 F. (205 C.)	Tensile Strength		Elongation	
			Fresh	Aged	Fresh	Aged
Average difference	397	456	415	680	0 78	1 28
Maximum difference	1250	1800	1300	1650	1 5	2 5
Minimum difference	20	50	50	50	0	0

are of most interest, especially in the development of a material that does not stretcher strain within, say, six months or longer at room temperature. So, strips were cold rolled 2 per cent on an experimental cold mill and held 3 hr. at the temperature of boiling water (which other tests have shown is about equivalent to 6 months at room temperature) and then tested in tension to determine the change in ductility, tensile strength, and the return of a sharp yield point and yield-point elongation. The latter two have been shown by the authors in *Transactions*, Am. Soc. Steel Treating, July, 1933, to be related very closely to stretcher straining. Commercial stability of physical properties against changes due to aging was interpreted as no increase in tensile test, and no return of stretcher straining after holding 3 hr. at 212 F. (100 C.). The amount of elongation at the yield point, as shown by an accurate stress-strain curve, can be used as a measure of the tendency to stretcher strain.

In the development of a stabilized steel for deep-drawing purposes, materials with varying degrees of stability have been tested. They range from mild steel to the stabilized material. In order to determine a definite relationship between blue brittleness and stability of physical properties, it was necessary to make both blue-brittle and aging tests on materials covering this range.

Table I gives the results of the blue-brittle and aging tests of a few of the materials tested. Representative load-deformation curves for the tests tabulated in the table are shown in Fig. 3. It will be seen that the roughness of the curves for the tension tests at 400 F. (205 C.) decreases from material No. 1 to No. 10. The changes due to aging likewise decrease and materials Nos. 7, 8, 9, and 10 show no differences in their load-deformation curves before and after aging nor are there any significant changes in the numerical values given in Table I.

A study of these results shows that as long as the tensile strength at 400 F. (205 C.) is not greater than at room temperature, the tensile strength and ductility of material cold-rolled 2 per cent are practically stable against changes due to aging.

In order to use the difference in tensile strength (400 F. (205 C.) to room temperature) as a measure of the stability of the drawing properties of sheet steel, it is necessary to consider both return of stretcher straining, as indicated by the yield-point elongation and the constancy of the tensile strength and percentage of elongation. A minimum difference in tensile strength (400 F. (205 C.) to room temperature) may then be adopted, which will insure any desired degree of stability in drawing properties against changes due to aging. A large number of various materials have been tested according to this procedure and in all cases it has been possible to predict whether the material would age after cold rolling.

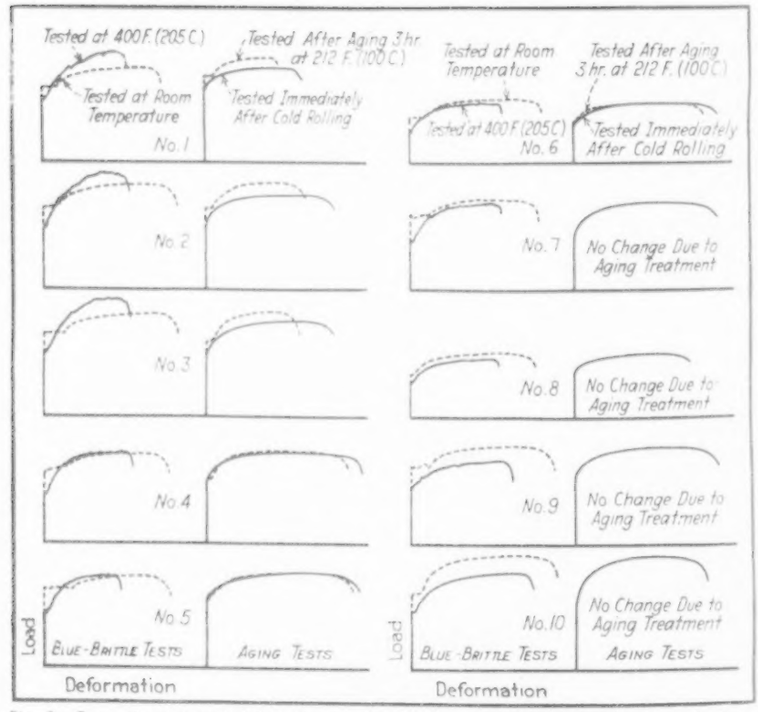
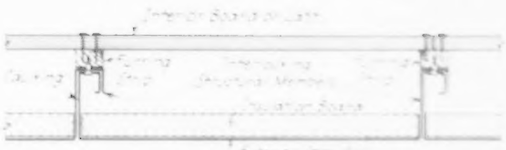


Fig. 3—Comparison of load deformation curves obtained in the blue brittle test with those in the aging test on the 10 materials given in Table 1.

The numbers refer to the materials and are in the same order as in Table 1. For the blue-brittle test the curves taken at 400 deg. F. (205 deg. C.) are to be compared with those at room temperature. For the aging test, the curves for the aged specimens are to be compared with those for the "fresh" specimens which were tested immediately after cold rolling.

Steel Building Without Joists, Studs or Rafters

Building in the farm group of the Century of Progress Exposition, Chicago, formed of ingot iron panels without joists, studs or rafters, is believed to open up a field for simple and quickly erected commercial buildings, garages and poster boards as well as for farm structures



Interlocking panels developed by the Steelox Co., Chicago, to be made available by the building supply trade, serve to form floors, walls and roof

THE home of the American Milk Goat Record Association at the World's Fair of Chicago will be a fireproofed, fire-safe, steel farm building built to demonstrate a new interlocking, self-framing system of construction by the Steelox Co., Chicago, in cooperation with the American Rolling Mill Co., the Celotex Co. and Sears, Roebuck & Co. The use of rafters, studs and joists is eliminated.

One typical unit is used to make the walls, partitions, roof, and even the doors. This unit is a channel-shaped panel, 16 in. wide and 3 in. deep with flanged sides so the flange of the panel slips into the flange of the adjoining panel. The sides, or legs, of the interlocked panels serve as structural members, while the bottom of the channel acts as a web for bracing the interlocked members. When interlocked in the wall, the surface weight is 2¾ lb. per sq. ft. All of the panels come to the job insulated with ½ in. of fiber board which is in place with a special adhesive and serving as a sound deadener as well as an insulator to the flow of heat. Where it is desired to finish the interior walls, the panels have a nailing strip attached to the flange. This serves as a nailing strip as well as cutting down materially thermal conductivity through the interlocked members.

Ordinarily, the interlocked panels are erected with the smooth side of the wall to the weather, and it is planned out, that the panels may be furnished with a permanent porcelain enameled surface. However, the steel ribs, formed by the interlocked members, may be turned to the exterior, providing a smooth wall inside.

When additional strength either as a column or a beam is necessary, the panels may be made deeper or of a heavier gage steel. The barn erected at the Fair is made of 20-gage galvanized Armco ingot iron.

Field assembly required no special equipment nor skill. A channel of No. 14 gage ingot iron was bolted to the foundation. Then a corner panel—a typical panel bent longitudinally at right angles—was set in place. The wall panels were then quickly interlocked. Short panels were inserted where door or window openings occurred. A hook bolt secured the interlocked members to the foundation channel. Heavy gage angles were used as top plates at the roof line, and to them the top of the panels were fastened with hook bolts. The angles used on the sides were folded over on the same pitch as the roof, to receive the roof panels.

The same typical panel forms the roof. A specially designed self-supporting ridge, with a short protruding flange on either side to receive the roof members was set in place. Then the roof panels were passed up and interlocked. Since all the roof units were of the same length, it was only necessary to align them at the eaves. Joints between all panels were sealed with the adhesive, a waterproof calking material. The roof panels were secured with hook bolts to the ridge and to the top plate on the wall.

After the roof members were in place, the panels were placed in the gable ends. Specially formed galvanized sheets were used for trim and drip boards.

The structure proved so strong and rigid that it required little bracing. V-shaped purlins were attached to the [illegible] of the roof members and connected with light steel rods. A short diagonal rod connected the purlin with the corner. As the building was constructed on a concrete slab, Steelox panels were used as flooring only in one bay over an alley to provide a loft for storing materials.

Engineers who visited the demonstration job expressed the belief that this construction will be of particular interest to those who may want to purchase the formed units and erect their own steel buildings. It is emphasized also that the buildings may be taken apart and moved with little or no loss. Multiplicity of parts is eliminated, and the Steelox panel becomes a commodity which may be stocked by the regular sources of supply to the building industry.

The American Rolling Mill Co. supplied all the sheet metal, Celotex furnished the insulation board, Sears, Roebuck & Co. the doors, windows and ventilators, and Paint Products Laboratories the adhesive and calking.

The barn is located near the south end of the World's Fair grounds, and is a part of the Poultry and Farm Group. To demonstrate to the public that the milk goat is a valuable and important domestic animal, the American Milk Goat Record Association will keep several prize animals in the building.

Giant Bliss Press Fabricated by Welding

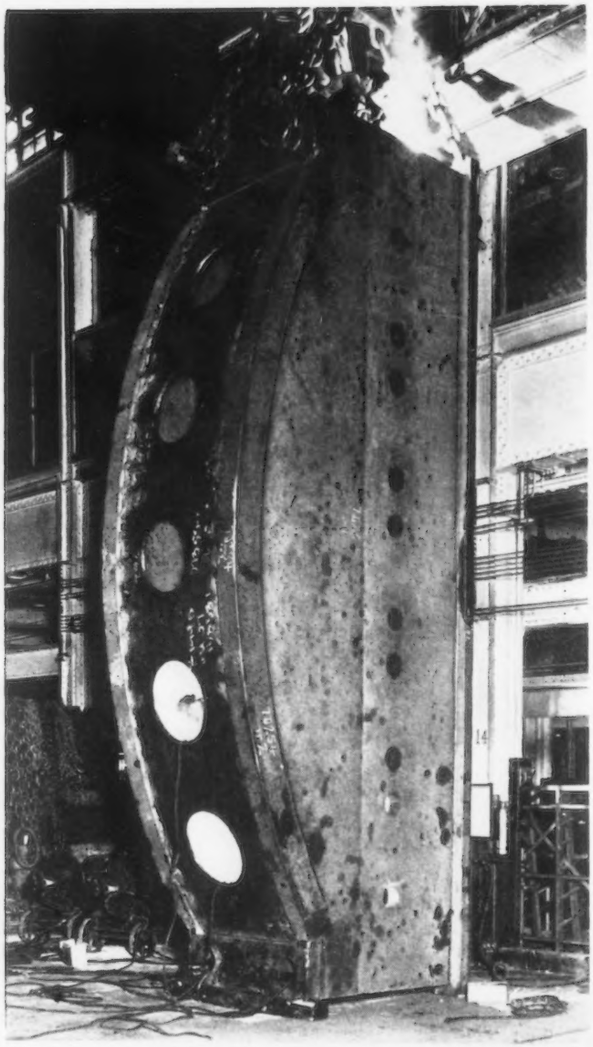
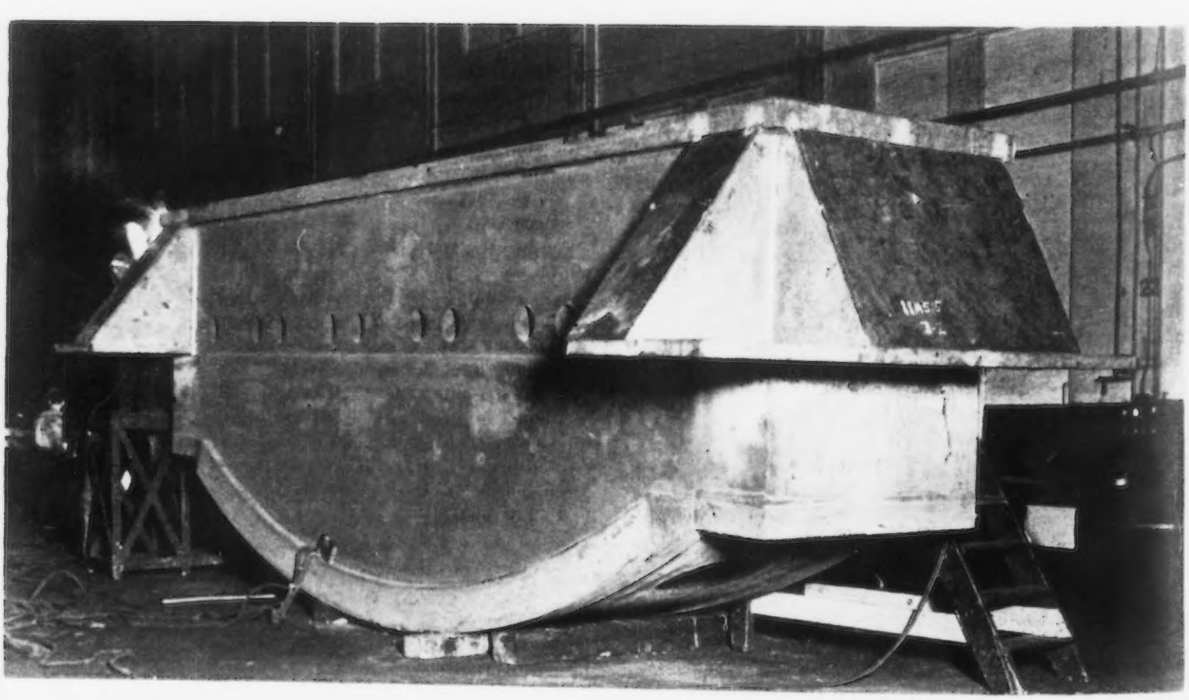


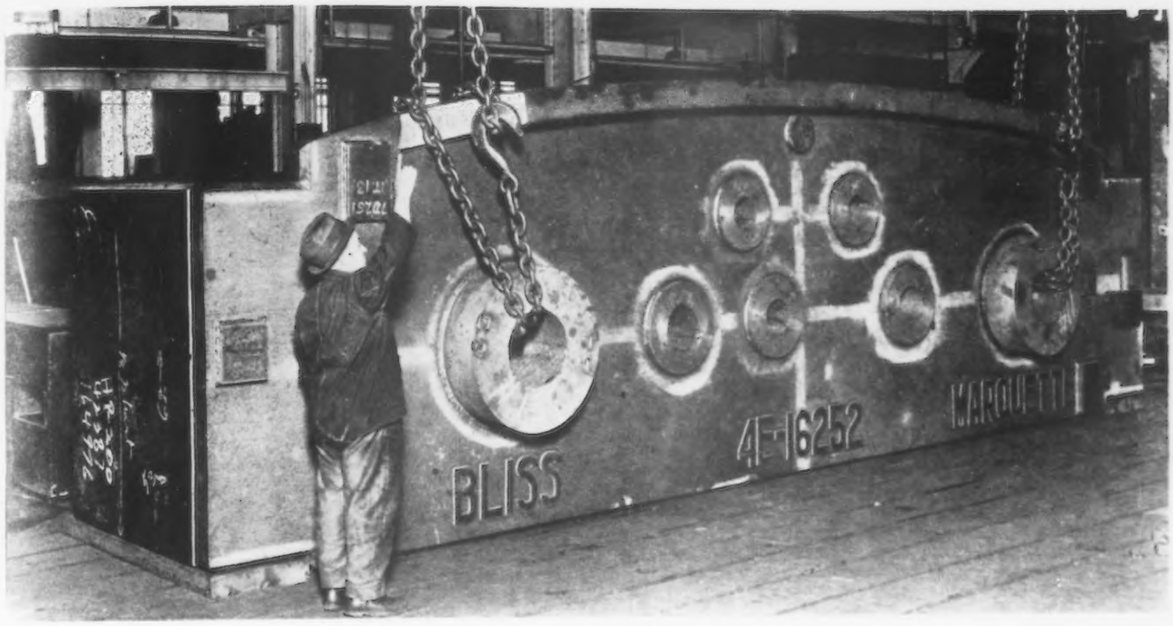
Fig. 3. (at left) — In welding, all bed and crown parts were positioned to assure joints of maximum soundness. For the end - sections, the press bed was positioned vertically, as shown.

Fig. 1. (below) — Welded steel bed of Bliss - Marquette forming press. This unit, with supporting feet, weighs approximately 160,000 lb.

FABRICATION of the welded steel bed and crown of one of the Bliss-Marquette forming presses described briefly in THE IRON AGE of Aug. 2, page 33, is illustrated on this and the opposite page. This work was done at the East Pittsburgh plant of the Westinghouse Electric & Mfg. Co., and is the largest single welding job at that plant since the fabrication of the eight very large Boulder Dam water gates completed late last year.

This press, built by the E. W. Bliss Co., Toledo, Ohio, for the Midland Steel Products Co., Detroit, is said to be the largest ever constructed of welded steel. It is to be used for forming automobile and truck frame side rails, which are made of 5-32-in. and ¼-in. steel stock. Working capacity is rated at 1800 tons, plus 300 tons for drawing cushions. The press measures 252 in. between hous-





...gs., the bed is 68 in. front to back, and the slide face measures 52 x 241 ... The machine weighs 750,000 lb. Fig. 1 shows the assembled bed. Steel plate 5 in. thick, 110 in. wide, and 330 in. long forms the sides; a 5-in. by 24-in. reinforcing plate is employed on top; and a 9-in. by 12-in. bar, bent into a segment of a circle, forms the bottom. These parts before assembly, but with the bottom plate and reinforcing plate in place, are shown in Fig. 2. The box-section ends are made up of 5-in. plates. The complete structure with supporting feet weighs approximately 160,000 lb. Fig. 3 shows the bed positioned vertically for welding of the end sections.

The press crown, Fig. 4, is made up of similar plates and is of like shape, except that cast steel bushings were welded to the side plates for the crank bars and gear shafting.

Welding quality plate furnished by the Carnegie Steel Co. was employed for these heavy presses. All parts under stress were welded with heavily-coated electrodes, with the piece properly positioned to assure sound joints. Joints were previously chamfered and close-fitted, and where necessary the layers of weld metal were peened with pneumatic hammers. Upon completion, the welded bed and crown, which weigh 160,000 lb. and 130,000 lb. respectively, were stress-relieved in a suitable furnace to remove internal strains due to local temperature differences.

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Fig. 4. (above) The welded steel crown weighs about 130,000 lb. The cast steel bushings welded to the side plates are for the crank bars and gear shafts.

Fig. 2 (at right) — Bed parts before complete assembly. The sides are of 5 in. plate, 110 in. wide and 330 in long. The bottom is made from a 9 x 12in. bar, bent into a segment of a circle.

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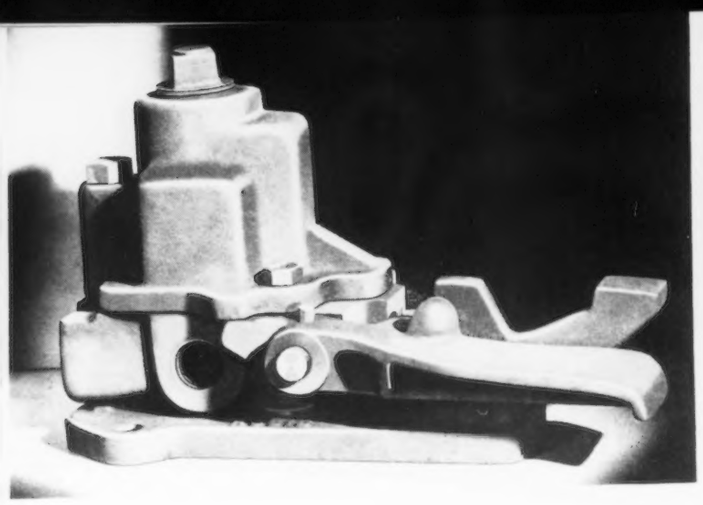
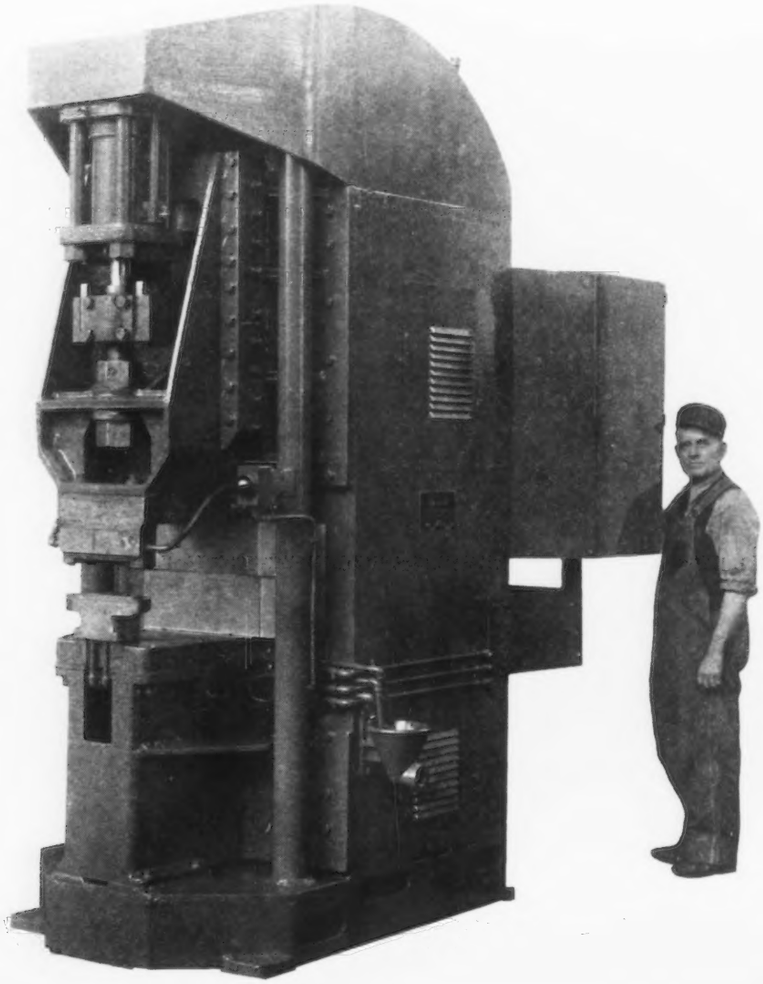
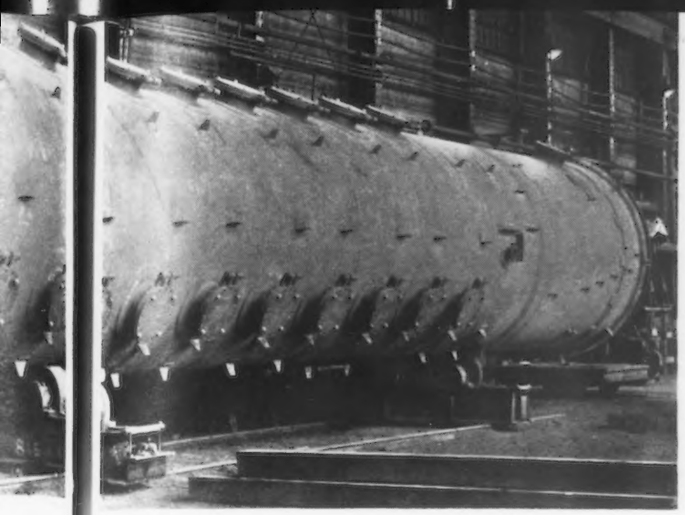


A TWO and one-half inch movement of the operator's foot actuates this new spool type foot operated valve. Base plate is made large enough so that the assembly will not tip even when not bolted down. Not designed as an aid to the armed man, but for operators who already have both hands full. Three or four way valve factory is provided. A new product of Hoover Engineering Works, Canton, Ohio.

THIS huge fractionating tower is 15 ft. in diameter and 58 ft. high. It was completely arc welded by the Struthers-Wells Co. using Lincoln Electric Co. Fleetweld electrodes. Shell thickness of the tower is ½ in. while the heads are ⅝ in. On completion of the welding the entire unit was heat treated. The column was shipped to Canada for oil refinery service in connection with the Dubbs cracking process.



HYDRAULICALLY-OPERATED projection welder. A big six-ton job for heavy work at pressures up to [illegible] lb. Practices what it preaches, being made of welded steel throughout. Takes care of such jobs as welding reinforcing [illegible] rear axle housings, valve tappet [illegible] bars and the like. (For further information, see page 9)



HERE is a way of facing concrete highways together. Pictured above is a section of the Smith metal faced joint made by the A. O. Smith Corp. and distributed by American Steel & Wire Co. The joint is turned at right angles from the position shown when placed in the subbase so that the "stitches" are embedded in the concrete.

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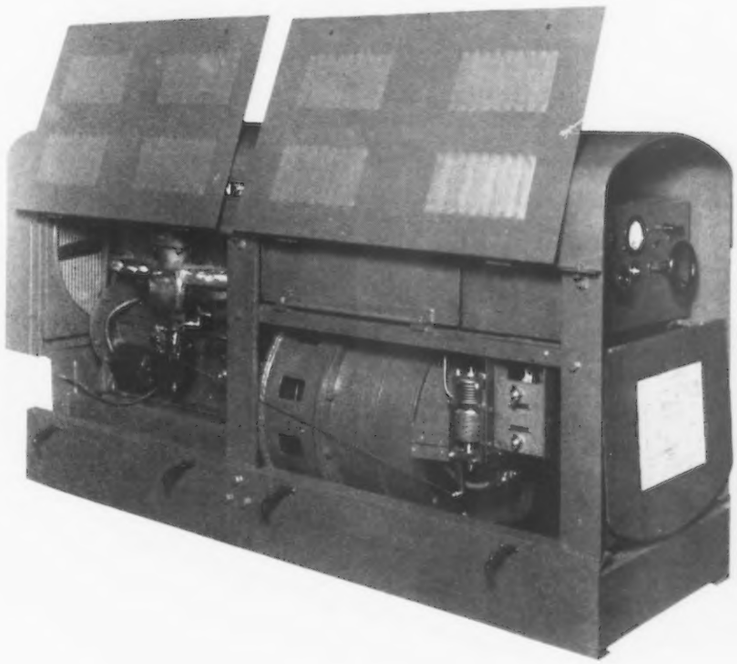
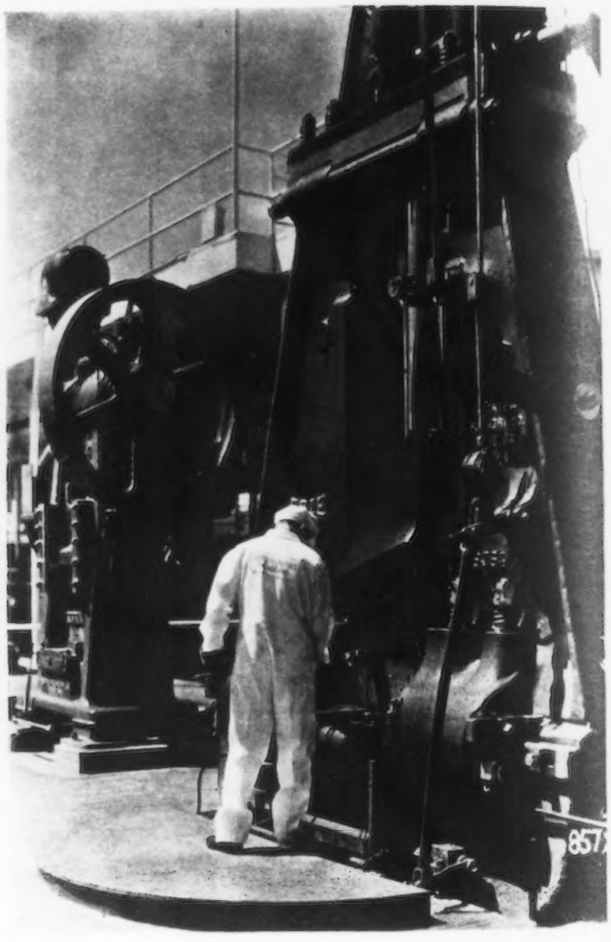


THE greater compactness and lighter weight of this new model Lincoln 300 amp. 40-volt, gas-engine-driven welder is attributed to close coupling. Rubber cushioning eliminates vibration, and a special idling device reduces engine speed when the arc is broken. (For further description see page 71.)

THIS steam locomotive, having neither water nor firebox, is said to be the first fully geared fireless locomotive built in this country and the only fireless "sailing" with pistol valves. Runs about a half day on a filling from the other boiler and recharge require less time than to take on coal and water. Maximum drawbar pull is 25,000 lb. Built by H. K. Porter Co., Pittsburgh, for the U.S. Navy Yard in New York.

THIS 4000-lb. steam drop hammer and trimming press, a feature of the Chrysler exhibit at the Chicago Fair, are in operation daily producing the front wheel spindle forging shown below, which is for Plymouth cars. The die employed is of unusual design.



Front-Wheel Spindles for Plymouth Cars Forged At Chicago Fair

OPERATION of a 4000-lb. steam drop hammer and a trimming press in the production of front wheel spindles for the Plymouth automobile is a feature of this year's exhibit of the Chrysler Corpn. at "A Century of Progress" exposition in Chicago. The equipment is being operated daily, and parts produced are shipped to Detroit. Both the hammer and the trimming press are standard machines built by the Erie Foundry Co., Erie, Pa. For convenience under existing working conditions the hammer is operated by compressed air rather than by steam.

This operating exhibit holds interest not only for the layman but for the engineer, and even the experienced drop forger, who will recognize in this set-up an excellent example of die making and forging skill on the part of Chrysler engineers.

From a technical standpoint interest centers in the design of the dies, and in this connection the Erie Foundry Co. has supplied the following data.

Spindles are usually drop forged with their center line lying in the parting line between the top and bottom dies. This, however, necessitates draft on the flange, on the wide face between the two bosses. The draft must be removed by a separate forging operation in an upsetter or in a press, or else must be machined off. Another disadvantage is that the spindle cannot be designed like the one illustrated, but must be modified by adding weights and metal between the two small lugs which extend from the bottom boss. Otherwise the forging would be undercut at those points and could not be made.

In the present case the dies are made with the parting line running around the edge of the flange so that the dies are interlocked, and the forging is gated at one edge of the flange. This would involve nothing unusual if it were not for the fact that in order to provide the necessary "toe-in" to the wheels, the center line of the spindle is not at right angles to the center line drawn through the two bosses. In other words, when draft is provided on the adjacent faces of the bosses the center line of the spindle is not vertical, but instead it extends into the die at an angle.

The forging is made from alloy steel bars 3 x 1½ in. in cross section, cut into 6-in. lengths. The blanks are heated to 2210 deg. F. in a gas-fired furnace equipped with automatic temperature control. The first operation is to draw out a taper at one end of the bar. For this a light, quick blow is required, and the hammer must be under perfect control to assure striking of blows of just the right force and at such a rapid rate that there is no opportunity for the metal to cool down.

This drawn-out tapered part is then placed almost vertically in another impression in the bottom die, and the section at the other end of the blank is flattened out and in subsequent operations forged to the desired shape. During these operations the forging remains in the bottom die, while the top die leaves the forging at each stroke, the usual draft being provided on the ends of the bosses. When finished the forging is removed from the bottom die, not vertically but at a slight angle from the vertical, corresponding to the "toe-in" angle of the spindle.

Ordinarily the spindle would be made in the top die rather than in the bottom one, because the hot metal fills the top die more readily than the bottom one. This does not apply in the present case due to to the spindle having been drawn out previously in the edger impression, and because of

the unique plan of not having the center lines of the impression in the top and bottom dies exactly in line with each other.

The hammer, said to be the largest piece of equipment at the Fair, weighs about 60 tons, not including the dies. The one-piece cast-steel anvil block alone weighs 40 tons, and it took two days to "house move" it from the railroad car to its foundation. The box section frames are of cast steel. Ram guides are of forged steel; they are adjustable but are so designed that they are surrounded by the frame on all four sides and have no vertical movement. The ram and sow block are made of Heppenstall forged steel. The piston rod, probably the most highly stressed part of any machine tool, is made of a chrome-vanadium-molybdenum steel and is integral with the piston. The entire valve gearing of the hammer is equipped with anti-friction bearings to assure sensitive control and eliminate fatiguing the operator. An important feature also is the ring-type motion valve designed to eliminate leakage at this point in the cylinder; the reduced air consumption is emphasized as important not only in lowering operating costs but also in reducing cost of installation, since the air compressor and receiver could be smaller.

Heavy-Duty Projection Welder Operates at Pressures up to 30,000 Lb.

VERTICAL tie-rod construction that permits application of 30,000-lb. maximum pressure is a feature of a new hydraulically-operated projection welder built by the Federal Machine & Welder Co., Warren, Ohio, for heavy projection work, such as the welding of reinforcing rings in rear axle housings, valve tappet assemblies and the like.

The machine is equipped with a Federal flashproof type transformer having a continuous rating of 600 kva. and an overload capacity of 50 per cent. The primary coil winding is of electrolytic copper, insulated between turns, and the secondary coil is of boron copper, and is cooled by water that circulates through pipes that are cast in place. Eight equal steps of heat regulation are obtainable.

Current timing is accomplished accurately by means of a Rees synchronous switch, which mechanically opens and closes the contactor. The switch is arranged also to operate a hydraulic valve to synchronize operation of the head with application of the welding current and to permit variations in speed over a wide range merely by changing the small drive gears. Stroke of the head may be varied from ½ to 6 in. It is stated that because of the synchronous operation the contactor eliminates to a great extent arcing at the contact tips.

The machine is fabricated of welded steel throughout. The lower knee is positioned to facilitate locating the yanjo housings or other pieces over the dies and there are no obstructions at the sides of the frame to interfere with the handling of the work. A set of water-cooled welding dies designed for the particular work to be welded is furnished with the machine.

The welding head is actuated hydraulically through a self-contained hydraulic system driven by a 7½-hp. motor in the base. The hydraulic cylinder on this machine is 5½ in. in diameter. The head is guided by a 31-in. long slide that has hardened and ground steel wearing plates, proportioned to assure proper alinement during the welding operation. The machine illustrated is 87 in. long, 57 in. wide, and is 107 in. high. It weighs approximately 12,350 lb.

Improvements Made In "Instant" Water Heaters

IMPROVEMENTS have been made in the "Instant" copper tube steam water heater now a product of the Johnson Corpn., Three Rivers, Michigan, by increased baffling which includes the addition of a spiral in the cold water inlet pipe. The patented principle involves the use of concentric steam and water chambers made of iron pipe size copper pipe. The cold water entering the heater passes spirally through the central chamber, which is surrounded by the steam in the second chamber, returning spirally in a thin sheet along the outside wall of the steam chamber creating a high velocity, turbulence and heat transfer rate.

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Increased baffling, including addition of a spiral in the cold water inlet pipe, is an improved feature of this "Instant" water heater.

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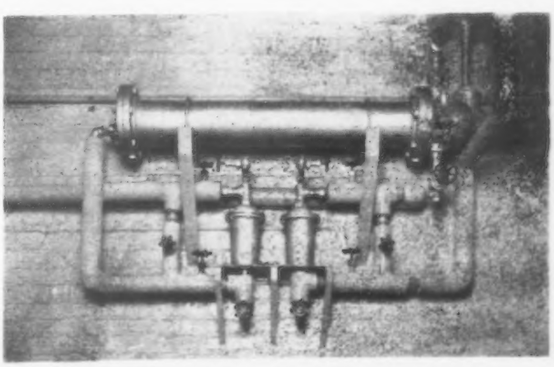


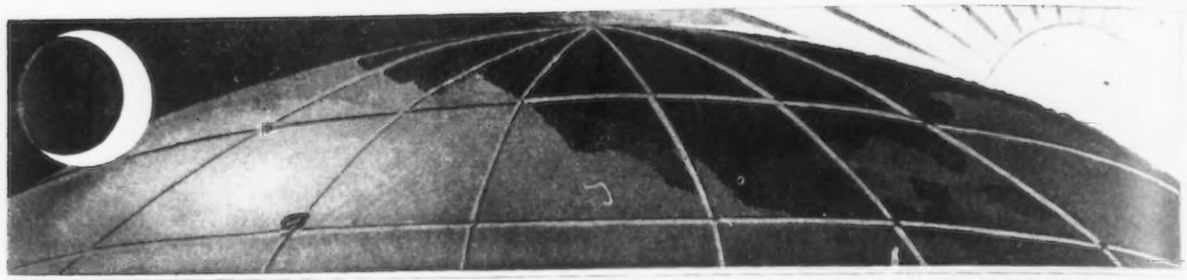
A new line of 5-in. heaters has been added to the 3-in., 4-in. and 6-in. series completing the range of capacities from 80 gal. to 6000 gal. per hour for steam pressures up to 150 lb. per sq. in. It is recommended by the makers for instantaneous or storage tank service, as a pre-heater or booster in connection with existing equipment and for treating oil, process liquids, etc.

Close-Coupled Gas-Engine Driven Arc Welder

THE Lincoln Electric Co., Cleveland, has brought out a new 300-amp. 40-volt capacity gas engine driven Shield-Arc welder which, due to close coupling, is much more compact and is lighter in weight than previous models. The generator is mounted on the engine housing with the drive lined up on hardened steel and driven on cushioned rubber. This method of coupling is designed to take care of any misalinement and to reduce vibration, the lessened vibration resulting in higher engine efficiency and lower gasoline consumption. A special idling device reduces engine speed when the arc is broken.

The welder is mounted on a rigid steel base with totally inclosed steel side curtains. The complete unit may be furnished with small steel wheels for factory use or with large 6-in. face steel wheels for outside use; it may also be mounted on two- or four-wheel pneumatic tired trailers.

Uniform current is said to permit use of a higher average current with increased welding speed. The capacity of the new welder is 60 per cent higher than its predecessor. Other features include dual control of welding heat, sparkless commutation, controls at convenient height, and arc welded steel construction. The new Lincontrol remote control device which enables the operator to adjust the current merely by tapping the electrode on the work, and eliminates time wasted in making trips back to the machine, is optional equipment.



THE NEWS OF THE WEEK

Welding Society Meeting to Have 30 Technical Papers

SEVEN technical sessions, with 30 or more papers, have been planned for the fourteenth fall meeting of the American Welding Society, to be held at the Hotel New Yorker, New York, Oct. 1-5. They will include discussions of structural steel welding, railroad welding, fundamental research problems, and the qualifying of operators of welding equipment and expenses incident thereto. There will also be the usual business session, presentation of the Samuel Wylie Miller medal, and the annual banquet, the latter on the evening of Oct. 4. Plant inspection trips are being arranged for Friday, Oct. 5.

The first technical session, Oct. 1, will include a popular lecture on "Steel Residence Construction," by F. T. Llewellyn, United States Steel Corpn., an address on the "Use of Polarized Light as Applied to Welding Products," by E. W. P. Smith, Lincoln Electric Co., and a paper on "Impact Resistance of Welded Joints," by W. Spraragen, secretary, American Bureau of Welding. Dr. D. S. Jacobus, advisory engineer, Babcock & Wilcox Co., New York, and president of the welding society, will preside.

Structural welding will be featured at the morning session, Oct. 2, under the chairmanship of L. S. Moissieff, consulting engineer, New York, and chairman of the society's structural welding committee. Papers will include: "A Critical Examination of Welded Pipe Materials," by D. H. Corey, engineer, Detroit Edison Co., and A. E. White, University of Michigan; "Investigation of Welded Steel Seat Angle Connections," by Inge Lyse and N. G. Schreiner, Fritz Engineering Laboratory, Lehigh University; "Photo-Elastic Studies of Seat Angle Problems," by Inge Lyse and D. M. Stewart, Lehigh University; and "Welding in Engineering Education," by J. H. Zimmerman, Massachusetts Institute of Technology.

Fundamental research problems in welding will be dealt with by seven different university research workers at a session to be held on the afternoon of Oct. 2, under the auspices of the American Bureau of Welding, the research department of the welding society. Papers include: "Welding of Cast Iron," by J. A. Needy, dean, Ohio Northern University; "Welding of Cromansil Steel," by H. M. Boylston, Case School of Applied Science; "Corrosion Fatigue of Welded Stainless Steels," by W. E. Harvey, Lehigh University; "Tests of Thermit Welds," by Percy Hodge, Stevens Institute of Technology; "Effect of Peening on Physical Properties of Welds and Stress Relief," by O. M. Harrelson, Georgia School of Technology; "Fatigue Testing of Welds," by J. H. Zimmerman, Massachusetts Institute of Technology; and "Residual Welding Stresses," by R. E. Jamieson, McGill University. Dr. C. A. Adams, professor of engineering, Harvard University, and director of the A.B.W., will preside.

"Silver Solders and Fluxes," by R. H. Leach, Handy & Harmon Co.; "Metal Spraying," by E. V. David, Air Reduction Co.; "Hard Facing," by B. E. Field, Haynes Stellite Co.; and "Flame Machining," by a representative of the Linde Air Products Co., are papers for the first session Oct. 3. I. J. Crowe, development engineer, Air Reduction Sales Co., and senior vice-president of the society, will preside.

A railroad session, with A. G. Oehler, editor, *Railway Electrical Engineer*, presiding, has been planned for the afternoon of Oct. 3. Papers include: "Track Maintenance," by I. H. Schram, engineer, maintenance of way, Erie Railroad; "Welded Rail Joints in Main Line Track," by H. S. Clarke, engineer maintenance of way, Delaware & Hudson Railroad; and "Technical Phases of Application of Welding in Hi-Tensile Division of E. G. Budd Mfg. Co.," by M. B. Butler.

Four papers are scheduled for the morning of Oct. 4. They are: "A Study of A. C. Arc Welding Circuit Characteristics," by A. M. Candy, Westinghouse Electric & Mfg. Co.; "Automatic Arc Welding of Class I Pressure Vessels," by O. A. Tilton, General Electric Co.; "Impact Resistance of Some Steels and Welds at Sub-Zero Temperatures"; by R. K. Hopkins, M. W. Kellogg Co.; and "Flame Cutting," by Dr. Bradley Stoughton, Lehigh University.

Although last on the technical program, the symposium on qualifying operators of welding equipment and expenses incurred therein, to be held on the afternoon of Oct. 4, promises to be an outstanding feature of the meeting. Marshall Williams, assistant to the president, American Bridge Co., will preside. Formal contributions will include: "Boiler Welding," by W. D. Halsey, Hartford Steam Boiler Inspection & Insurance Co., and Alexander Kidd, M. W. Kellogg Co.; "Shipbuilding," by E. D. De'es, Bethlehem Shipbuilding Co., and H. W. Pierce, New York Shipbuilding Co.; "Structural Welding," by G. D. Fish, Westinghouse Electric & Mfg. Co.; "Pipe Welding," by Dr. S. Lewis Land, Heating and Piping Contractors National Association; and "Testing of Welders," by J. W. Owens, director, National Weld Testing Bureau.

A. C. F. to Build Two Streamlined Trains

CHARLES J. HARDY, president, American Car & Foundry Co., announces that his company has entered an order from Gulf, Mobile & Northern Railroad for two lightweight, streamlined trains, three cars each; and an extra streamlined coach. These cars, seven in all, are to be fully streamlined, non-articulated type.

The construction will be of lightweight alloy steel. Entrance and exit will be in center rather than end as in conventional standard equipment. Closures between cars will be flush with outer contours of cars to obtain proper streamlined effect.

The first car, comprising the power unit, will have a Diesel electric en-

and. This power car will also have mail and baggage compartments.

The center coach is to be a day passenger, divided into two compartments. A buffet kitchen, from which meals will be served throughout the train, will be provided.

The third car will be a sleeper-observation car, providing stateroom and six upper and six lower berths. Rear end of car will be observation lounge car, completely streamlined, with rounded end permitting unobstructed vision on all sides.

Cars will be completely air-conditioned. Indirect lighting will be featured throughout. These two trains will be built at the Berwick, Pa. plant of A. C. F.

Warner & Swasey Co. Sees Replacement Pick-Up

HEAVY industry, the first to suffer and one of the last to recover from the effects of a depression, is again stepping into the machine tool field and investing in equipment to replace obsolete machinery.

This is indicated by the report for the first six months of 1934 just issued by the Warner & Swasey Co., machine tool and precision instrument builders, Cleveland.

Railroads, manufacturers of road machinery, oil well equipment, steel products, welding equipment and ship builders were all listed on the company's books during the first half of 1934.

The company's total business showed an increase of 110 per cent as compared with the same period of 1933 and its exports were nearly 100 per cent larger. Although the total is sizable, officials say that they still must show greater increases before the volume approaches normal.

"A hopeful indication," says C. S. Sedwell, sales manager, "lies in the fact that our business was well distributed throughout the industrial United States, indicating that recovery efforts are not local in their effect.

"The increasing volume of sales and the character of the companies placing indicate a gradual but widespread revival in the durable goods industries.

"Turret lathes themselves are classed as durable goods. It is significant that during the last six months we sold more turret lathes to concerns manufacturing durable goods than were purchased by firms manufacturing consumer merchandise.

"A sign of encouragement results from the evident willingness of management to invest substantially in new equipment even though present volume of production is low. The persistent restriction of profit possibilities compels an increased efficience in all manufacture.

"Substantial orders were received from manufacturers of canning machinery, electrical equipment, molds and forms, oil well equipment, pumps and engines, bushings and castings, and miscellaneous machinery producers. Manufacturers of gears, couplings and tubing, air equipment, railroads, road machinery, steel products, dies, welding equipment and shipbuilding were also booked.

"Automobile and automobile parts manufacturers and makers of airplanes and airplane motors were substantial buyers.

"Consumer's goods industries, such as textiles, fixtures and appliances, foods, tobacco, etc., accounted directly or indirectly for a smaller share of the business.

"Particularly significant is the spread of orders. Forty-eight distinct classifications of business were represented among turret lathe purchasers, with products ranging all the way from railroad cars to cigarettes and razor blades."

Louis Allis Sales Trebled

TOTAL sales (billing) for first half of 1934 more than trebled the same period last year for The Louis Allis Co., Milwaukee, manufacturers of industrial electric motors, generators, etc.

In addition to the general improved business conditions, officials of the company attribute their increased sales volume to the unusual quick delivery service on urgent orders.

A recent typical example was the manufacturing, testing and shipping of four 100-hp. special motors to the Fort Peck government project in exactly seven working days.

American Engineering Council Annual Meeting

THE next annual meeting of American Engineering Council will be held in Washington, D. C., Thursday, Friday, and Saturday, Jan. 10, 11, and 12, 1935.

It is planned to devote Thursday, Jan. 10, to the meetings of committees, and Friday and Saturday, the 11th and 12th, to sessions of the Assembly.

THE Egyptian Government is inviting tenders for the erection of an electric power station at Kalioub and for the supplying of all necessary machinery. A grand 20-year scheme of water regulation is in prospect, and coming years should witness a large demand for structural materials, pumps, etc.

Standards Association Names Advisory Committee

NINE industrial leaders have been named to membership on the advisory committee of the American Standards Association, Howard Coonley, president of the Walworth Co., New York, and president of the Association, announced today.

"The importance of standardization is being multiplied as industry and invention continue to extend their frontiers further and further into new fields," Mr. Coonley said.

"As industry becomes increasingly complex and ramified, we must depend more and more upon the coordinating functions of standards. The standardization movement is today one of the most important integrating agencies in the country. It offers a democratic, widely representative forum to which come manufacturers, distributors, and consumers to work out together their problems without governmental supervision."

George E. Cortelyou, president, Consolidated Gas Co., will be chairman of the advisory committee.

Members of the committee are:

Sewell L. Avery, chairman of the board, Montgomery Ward & Co., president, U. S. Gypsum Co.; Lammot duPont, president, E. I. duPont de Nemours & Co., chairman, General Motors Corpn.; Walter B. Gifford, president, American Telephone & Telegraph Co.; Henry I. Harriman, president, Chamber of Commerce of U. S. A.; W. A. Irvin, president, U. S. Steel Corpn.; James H. McGraw, chairman of the board, McGraw-Hill Publishing Co.; Gerard Swope, president, General Electric Co., and Daniel Willard, president, Baltimore & Ohio Railroad.

Organized 16 years ago as the national clearing house for technical standards developed by five engineering societies, the association today has grown to a membership of 47 national organizations. These are either a trade association, a technical society, or a Government agency. The association has 1233 company members.

Beehive Coke Output Dropped in June

ACCORDING to the preliminary statistics of the United States Bureau of Mines, June production of beehive coke amounted to 48,000 tons in 26 working days, as compared with 51,300 tons in 27 working days in May and 50,100 tons in 26 working days in June, 1933. For the half-year period ended June 30, the total production of beehive coke is estimated as 524,700 tons against 403,700 tons for the same period in 1933.

... PERSONALS ...

PERCY JENKINS, who has been identified with the Wickwire Spencer Steel Co., New York, since his graduation from Harvard in 1924, has been appointed New England district sales manager, with offices at 80 Webster Street, Worcester, Mass. EDWIN C. STOUT, who joined the company in 1920, has been made sales manager of the Eastern district sales department, with offices at 41 East Forty-second Street, New York.

Mr. Jenkins, for several years after joining the company, received direct mill experience in the Massachusetts plants of the company and later was made assistant sales manager of the mechanical specialties sales department. For the past year he has served as acting sales manager of the Eastern district.

Mr. Stout's experience in the trade covers more than a quarter of a century. Starting in the steel business in 1908 as a clerk, he became an assistant sales manager in 1914. He joined the Wickwire Spencer Steel Co. in 1920 as representative covering Ohio, and in 1924 became sales manager of the springs and specialties division at New York.

P. JENKINS

E. C. STOUT

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JAMES C. VIGNOS, who during the past eight years has specialized in problems covering alloys of iron and steel, high-strength cast iron and special alloy irons, has joined the sales division of the Ohio Ferro-Alloys Corpn., Canton, Ohio, and has been assigned to the Eastern district.

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G. H. BURKHOLDER, formerly of Philadelphia, has been appointed Western sales manager of the positive drive division of the Link-Belt Co. Headquarters will be at the company's Dodge plant in Indianapolis.

Other appointments are: W. H. KINKEAD, manager of sales of the Link-Belt speed reducers, with headquarters in Philadelphia, succeeding Mr. Burkholder; and G. L. Gross, who succeeds Mr. Kinkead and will henceforth be responsible for Philadelphia office sales of the positive drive division.

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PAUL F. VOIGT, vice-president, Allegheny Steel Co., Brackenridge, Pa., has returned from a three-month vacation in California.

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M. J. CZARNIECKI has been elected vice-president in charge of sales for A. M. Byers Co., Pittsburgh. He succeeds H. W. RINEARSON, who has resigned. Mr. Czarniecki joined the Pittsburgh sales organization of the Byers company in 1913, and the following year was assigned to the New York office, where he remained until he was transferred to Chicago in 1915. After the war he returned to Chicago as district manager, and the next year was appointed to a similar position in the New York district. In 1925 he became assistant general manager of sales with headquarters at Pittsburgh. In 1930 he was appointed manager of tubular sales for the company, and in December, 1932, he became general manager of sales. Mr. Rinearson joined the company as vice-president in charge of sales in August, 1930. Prior to that time he was general manager of the Armco Culvert Manufacturers Association at Middletown, Ohio.

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ALLAN FRASER, well known in the steel industry because of his long association with the American Steel & Wire Co., Wickwire Spencer Steel Corpn., and Crucible Steel Co. of America, has formed his own sales organization at 130 West Forty-second Street, New York.

Mr. Fraser is the inventor of the new steel "Accesso" desk tray which has just been announced to the trade by the Yawman & Erbe Mfg. Co., of Rochester, N. Y.

Mr. Fraser's company will operate as Accesso Desk Tray Agency.

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WALTER J. KOHLER, president, Kohler Co., Kohler, Wis., and former Governor of Wisconsin, and WILLIAM W. COLEMAN, president, Bucyrus-Erie Co., South Milwaukee, Wis., have been elected trustees of the Northwestern Mutual Life Insurance Co., with home offices in Milwaukee. The board of trustees numbers 35, including manufacturers and business and professional men representing all sections of the United States.

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RALPH S. EVINRUDE has been elected president of the Outboard Motors Corpn., Milwaukee, to fill the vacancy

ROBERT D. BARTLETT
Appointed general manager, Franklin Steel Works, Franklin, Pa., as announced in THE IRON AGE of Aug. 2.

C. F. MACKEY
Who resigned as general manager, Franklin Steel Works, after 30 years of service.

JAMES D. QUINN
New general sales manager of the Franklin Steel Works.

by the death of his father, ... Evinrude, originator of the outboard engine now in universal use. The new president, 27 years old, and a graduate of the University of Wisconsin, has been identified with the industry since boyhood. In 1927 he was placed in charge of racing research and two years later in charge of the export division. He was elected a director in 1931. Other officers are: Chairman of the board, STEPHEN F. BRIGGS, president of the Briggs & Stratton Corpn., Milwaukee; vice-president, treasurer and general manager, JACOB STERN; secretary, JOHN L. BROWN, of Detroit.

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JOSEPH T. SOMERS, vice-president and general manager of the Wyckoff Steel Co., Ambridge, Pa., has been appointed a member of the commercial committee of the American Iron and Steel Institute.

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WILLIAM B. TODD, general sales manager of the Jones & Laughlin Steel Corpn., has been made a member of the commercial committee of the American Iron and Steel Institute to succeed S. E. HACKETT.

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WILLIAM H. POUCH, president, Continental Steel Co., New York, is chairman of the industrial advisory committee of the Federal Reserve Bank of the Second District. Recent amendments to the banking law provide for extending loans to established industrial and commercial businesses for working capital, and the operating machinery includes an advisory committee for each district bank, to help handle applications for loans.

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H. F. FAIRLESS, vice-president of the Republic Steel Corpn., Youngstown, has been named chairman of the commercial committee of the American Iron and Steel Institute, succeeding S. E. HACKETT.

British Stainless Merger To Acquire Firth-Brown

In connection with the amalgamation of the stainless steel manufacturing interests of the Sheffield concerns Thomas Firth & John Brown and the English Steel Corpn., it is proposed that the Tinsley works of the former company shall be taken over by the new company which is to be formed to embrace the amalgamated operation of these businesses.

The Firth-Brown enterprise already possesses one of the largest stainless steel producing plants in the world and has done much to further the improvement of the material and its adaptation for commercial purposes. Its electric furnaces are of the largest and most modern kind operating in Europe, and the works have been so busy for some time that another furnace is to be installed immediately.

The English Steel Corpn. at its Sheffield works is also a large manufacturer of stainless and corrosion-resisting steels, and there are now such heavy demands for these materials within the ramifications of the Vickers group that extension of productive capacity has become essential. It is understood that, but for the present arrangement, the firm would shortly have put down new plant for the purpose.

A. J. Grant, managing director of Thomas Firth & John Brown, who is to be the first chairman of the new undertaking, has given an assurance that there will be no displacement of staffs in either of the parent concerns. On the contrary, it is hoped to increase the number of employees.

Training Course In Radiography

ST. JOHN X-RAY SERVICE, INC., will conduct a training course in metal radiography at its Long Island City, N. Y., plant during the week of Oct. 8. This course has been scheduled to follow the National Metal Exposition in New York.

Standards For Aluminum Alloys Are Developed

THE British Chemical Standards, Middlesbrough, England, has recently released information concerning a unique standard sample for aluminum alloys high in silicon. The elements which are now standardized include 12.74 per cent Si, 0.31 Fe, 0.005 Mn, 0.020 Zn, 0.006 Ti, and 0.010 per cent Cu. The standard is issued in bottles containing 500, 100 and 50 gm., and each bottle is provided with a certificate showing the analyses of each element by several chemists together with an outline of the testing methods which were used.

A second 15-20 ton top-charge direct arc basic electric furnace is being built by the Pittsburgh Lectromelt Furnace Corpn., Pittsburgh, for the International Nickel Co. Top charging is said to be quickly performed with this type of equipment, in which the roof and superstructure are arranged to swing aside horizontally and a drop bottom bucket is employed to deposit the charge on the hearth.

OBITUARY

L. F. NAGLE

LOUIS FREDERICK NAGLE, general sales manager of the Central Iron & Steel Co., Harrisburg, Pa., died after a short illness in that city on Aug. 2, aged 66 years. Following his graduation from the Arms Academy of Pottstown and the National College of Commerce, Philadelphia, he began his business career with the Glasgow Iron Co., Glasgow, Pa., with which he was associated for about 10 years. He then joined the Worth Brothers Co. and for 19 years served as general sales manager and purchasing agent. When this company was absorbed by the Midvale Steel & Ordnance Co. he left to establish the Nagle Steel Co., which operated for about 10 years. Mr. Nagle became identified with the Central Iron & Steel Co. in 1924 and shortly afterward was made general sales manager.

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WILLIAM T. OMWAKE, chairman of the board of the Landis Tool Co., Waynesboro, Pa., died recently at the age of 78. He became associated with Landis Tool Co. in 1897 at the time of its incorporation and was a director continuously since that date. In 1912 he was elected president and in 1925 chairman of the board.

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ROBERT B. DAVIS, designer and supervisor of construction of the Sessions Foundry Co., Bristol, Conn., plant, and at one time manager of the bridge and construction department of the Pencoyd Iron Works, Philadelphia, died at his summer home in Chatham, Mass., July 31, after a long illness. He was born in Jersey City, May 20, 1855.

In celebration of its twenty-fifth anniversary, Hydraulik, G.m.b.H., Duisburg, Germany, has issued an illustrated pamphlet in specially illuminated covers, devoted to the hydraulic machinery it builds, particularly forging presses.

THE WEEK IN WASHINGTON

Business Hopes For Definite Statement of Policy

Believes That Clear-Cut Presidential Announcement of Administration's Purposes Is Necessary

By L. W. MOFFETT
Resident Washington Editor, THE IRON AGE

WASHINGTON, Aug. 7.—With President Roosevelt en route to Washington after his long vacation cruise and a much-needed rest, it is clear that business is hoping for early and positive action that will be reassuring. Cabinet members also are about to return to the capital, so that administration machinery once more soon will be available to start a market upswing. For it is only too obvious that there has been a decided decline in confidence during the President's absence.

The drop in industrial production to an index of around 80 is more than seasonal. The steel industry has seen a particularly sharp falling off in new business. There was of course an expected decrease in steel in the third quarter following the relatively heavy bookings and shipments in the second quarter. Orders were placed and deliveries made, with a rush toward the end of the second quarter, in order to get advantage of the lower prices then prevailing. This movement was stimulated by the code requirement that, except for steel for identified structures, specifications must be made against contracts and shipments completed within the current quarter if the consumer is to be allowed the price prevailing at the time he places his order.

A rather substantial increase in third quarter prices had been announced and undoubtedly this was a factor in building up second quarter tonnage, some of which was stocked. While the original third quarter levels, at which virtually no business was placed, were withdrawn and reduced prices were announced with resulting orders, the incoming business has been disappointing. This is true of all lines and most markedly so with regard to the so-called heavy products, including plates, shapes and bars. Immediate indications at least still point to the automotive industry as the mainstay for steel consumption, though new business in such lines as sheets and strip is evidence of the drop in demand from that highly important purchasing source. The growing recognition by the steel industry of the automotive industry as a consumer is seen in the new strip mill construction under way or planned. It has been noted too that the more consistent dividend-paying steel companies are suppliers of automotive requirements, some largely so, and others to an important degree. Fortunately in the second quarter companies engaged only slightly on flat-rolled production netted profits.

Business Hopes for Widening of Demand

The hope of business is that there will be a spreading out of sources of demand. Much as it would like to see the railroads again come into the market after their recent fair-sized buying movement, thanks to Government loans, there is doubt that this is likely to be an early development. Carriers need a great deal more equipment, including modern metal-working machinery, and rolling stock, with its decided turn to alloy units, together with more rails. But with a let-down in traffic and burdens in the form of unemployment insurance and pensions, the incentive for coming into the market is hard hit. Raising rail rates is not accepted as the answer by shippers, many of whom at least, are in no position to pay higher transportation costs. At a time when this move is said to be in contemplation, the railroads have again taken a turn in the opposite direction in response to a Government "suggestion," if not implied demand, and established emergency rates on livestock and agricultural products by reason of the growing seriousness of drought conditions, a situation which has reduced farm purchasing power and added to the huge outpouring of Government money for relief.

To a degree, however, losses have been offset by higher prices and higher income, yet this development is bringing increasing complaints from the consuming public which sees a rise in prices without compensating gains in wages, some of which have been forced by codes to levels that important sections of industry are finding it difficult to maintain. There is also much apprehension over the labor situation with an alarming outbreak of strikes, though recent settlemen

...had a somewhat reassuring effect, tempered, however, by renewed trouble which has been the case with regard to some situations. The war scare in Europe is a source of some disturbance, and likely has shut off greatly needed export business, but so far it has proven a minor condition, yet one that may develop into a major situation. At present, while recognized as being an unknown quantity, the view here is that war within the next year or so is improbable.

Policies Anxiously Awaited

All of these are matters which no doubt will be given consideration by the President and his cabinet, and determination of policies for restoration of business confidence is unquestionably anxiously awaited. For one thing the durable goods industries are hoping that a move will be made which will encourage the flow of capital, especially private capital, to them, a turn that would mean more toward the absorption of the tremendous unemployment than any other step, and with it a sharp rise in purchasing power and therefore a positive move toward recovery, so painfully lagging after almost five years of depression.

The hope is that the money market will be loosened to encourage private investment that will flow to the durable goods industries, and with it there will be a let-up in the enormous drain on the Federal treasury for relief, now going to perhaps 15,000,000 people, and other purposes, such as AAA contributions for crop reductions, an ironic performance in view of the devastation wrought by nature. Fortunately, it is reported, it is planned to shift from this artificiality, though perhaps not in the immediate future. This seems unlikely during a political campaign.

What encouragement may be given toward stimulation of the durable goods industries remains to be seen but it is evident there is less apprehension than originally prevailed over the restrictions under the amended Securities act, for the policies announced by the Federal Securities Commission appear to be more liberal than business generally thought they would be. There is of course the ever-present concern over the monetary policy, fear of inflation, by further devaluation or otherwise, which will have to be cleared up before stability and reassurance can be established. The concern over inflation is seen in what appears to be an even more marked attitude by those with capital to remain "liquid," purchase short term Government bonds, a factor which is held to be retarding normal business growth. There is no doubt that some are preparing to profit from inflation but relatively few are purchasing goods or building up commodity stocks. However, the profits promise to be sharply pared judging from reports that the Government is considering heavy taxation on speculative profits, heavier than the other forms of growing taxation which is inevitable in view of the great Governmental expenditures from alphabetical agencies which are responsible for the sharp rise in the Government's executive personnel now at the high total of 661,000 of which some 81,000 are employed in Washington.

NRA Has Lost Prestige

There is also much interest manifest as to the new NRA policy. Despite bitter attacks on the press and other critics of NRA by Administrator Hugh S. Johnson, who has returned to Washington to resume direct control over the Blue Eagle's destinies, it is rather widely conceded that NRA has lost much prestige. Code violations are mounting as NRA moves almost exclusively into the administrative field, and the bad effect this has on those who adhere to codes is increased by dissensions over labor policies within the organization, as seen in the Harriman and Greif cases.

The price policy likewise is a disturbing factor. It has undergone several changes, as have other NRA policies, all adding to uncertainties of its relation to business. The move is distinctly toward loosening price provisions though NRA still insists it proposes to prevent so-called chiseling and gouging. Certainly the President's order of June 29 proved startling to business and industry. For the President in proposing that bidders could cut as much as 15 per cent below code prices in connection with local, State or Federal Government business, said the lowered prices would be made available to the public. The NRA legal division has held otherwise. It stated, with good reason in view of the wording of the executive order, that the reduced prices would apply only to Government business, though one deputy administrator has said they would apply to the public as well, thus taking the President's view, which certainly ought to be important. General Johnson never commented on the order beyond saying he had received "an awful lot of kicks" against the order.

Even aside from the actual interpretation of the order, it is the belief that once an industry reduced prices to Government agencies their customers would insist upon like prices, and it is now a question as to whether President Roosevelt will see that the matter is brought to a definite head soon.

The steel industry has held it would be a code violation to make lower prices to Government agencies than to private buyers because the code constitutes a contract calling for equal price treatment for all purchasers. The legal division of NRA told the industry that reduced prices would apply only to Government business and that while they must be filed with the code authority they would be filed for "information only."

Test on Price Reductions Coming

Nevertheless, the industry so far has stuck by its code prices in submitting bids on Government business. The most outstanding instance in which it has followed this policy was in connection with bids submitted by a number of producers last Thursday on 700 tons of sheet piling for Panama canal. A broader test is expected when bids are made on about 41,000 tons of plates and shapes for 24 naval vessels. Bids on the vessels are to be taken Aug. 15. Half of them are to be built in navy yards and half in private yards.

Code Doings and Undoings

Gray Iron Foundry Code Exemption

ON May 26, NRA issued Administrative Order X-36 which provides that a manufacturing establishment whose operations would fall under several codes need only pay code administration expense to the particular code authority representing the majority of the company's business; unless NRA granted specific exemption to any particular industry, under the terms of which exemption it might be empowered to collect code administration expense from every member of that industry regardless of whether the percentage of business concerned was a small part of the particular company's activity or otherwise.

One group very vitally concerned with this ruling is the Gray Iron Foundry Industry. Many plants operate a foundry as a department of their business, producing castings for their own requirements and, as occasion permits, engage in jobbing work for outside customers.

The Gray Iron Foundry Industry Code Authority, immediately after the release of Administrative Order X-36, filed a request with NRA for exemption, on the basis that a large proportion of the total industry tonnage was produced in plants where the major line of activity was something other than the production of Gray Iron Castings.

NRA promptly granted the request for exemption, recognizing the justice of the Code Authority's contentions. It is therefore necessary for every company doing jobbing casting work to report to the Gray Iron Foundry Industry Code Authority for that portion of their work, and also to bear their proportionate share of Code administration expense.

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Electric Motors and Speed Reducers

WHETHER the electric motor is the important item and speed-reducing gears merely an accessory, or whether the gears are the vital point and the motor merely is fastened on to them to furnish power, is a question which the NRA

must decide in the near future in order to settle a point at issue between the electrical industry and the gear manufacturing industry.

At a hearing before Assistant Deputy Administrator Walter Mangum, representatives of the code authority for the electrical manufacturing industry, who are asking for manufacturers of geared electric motors exemption from the definition of "industry" in the approved code for gear manufacturing, attempted to prove that the electric motor was the basic constituent of such combination and that the gears by which the speed of the motor is reduced for commercial purposes were simply a refinement of the product.

Representatives of the gear industry tried to prove just the opposite.

The application for exemption was made by the electrical Code Authority in behalf of 29 companies. Their case was argued by Clarence L. Collens of the industrial apparatus division of the electrical manufacturing code. In a lengthy presentation of his request, Mr. Collens recited the history of the electric motor and explained the different types of motors. He insisted that the gears used in this process, either those purchased from a member of the gear industry or manufactured by members of the electrical industry for their own use, were simply a part of a larger manufacturing process. He pointed out that certain types of electric motors have fans for self-cooling purposes, and the motors are used to operate ordinary types of household or office fans. He added that there never had been any attempt to put those manufacturers under the fan and blower code.

Electric tools, he said, also embody gears, as do the motors that operate phonographs; but there never was any question of putting their makers under anything but the electrical code. To a very large extent, he said, members of his industry who use gears employ them on resale operations.

His plea was seconded by C. F. Pittman, representing the General Electric Company of Schenectady; F. M. Mason, Jr., of Fairbanks Morse, Chicago; W. H. Nicholas, representing the Master Electric Co., Dayton, Ohio; and W. C. Davis of the Janeth Mfg. Co., Chicago.

The Deputy Administrator also read a long list of letters and telegrams from members of the industry urging the exemption.

L. R. Boteau, as spokesman for the gear code authority, and also speaking individually for the Westinghouse company, opposed the request for exemption. He stated that most manufacturers of motors send them to the factories of gear manufacturers for assembling with speed-reducing machines. He showed a large number of photographs in which the speed-reducing machinery dominated the electric motor in size and apparent importance.

H. L. Brunson, of the NRA Labor Advisory Board questioned members of the electrical industry closely as to the effect the requested exemption would have on their employees. Members of the industry contended that the effect would be practically nil, as they already were paying wages well above any code minimum to most of their employees.

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Non-Ferrous Exemption Terminated

THE NRA has approved the application of the code authority of the non-ferrous foundry industry for termination of the exemption granted under Administrative Order X-36 of May 26, 1934, whereby members of their industry whose principal line of business is covered by another code, were exempted from the necessity of contributing to the cost of administration of the non-ferrous foundry code.

It is provided, however, that the termination of the exemption shall be limited to those members of industry whose foundries produce non-ferrous castings as defined by the code of fair competition, whether processed or not, for sale, as castings, and this termination of exemption shall not apply to those members of industry whose foundries produce processed non-ferrous castings, all of which castings are sold as parts or products covered by the definitions of others' codes which have been or may be approved.

The code authority submitted a statement showing the estimated total dollar volume in the industry to be $21,500,000. Of this total 40 per cent is done by those whose principal line of business is in this industry, and that if the entire industry is assessed, an assessment of two-tenths of 1 per cent the dollar volume will be all that will be necessary to cover the budget. On the other hand, without the exemption sought that part of the industry whose principal line of business is the production of non-ferrous castings would be forced to an assessment 150 per cent larger than otherwise.

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Diesel, Jack, Concrete Mixer and Railway Appliance

THE NRA has announced approval of four codes, all supplements of the approved code for the machinery and allied products industry. The four codes cover the Diesel engine manufacturing, jack manufacturing, concrete mixer and railway appliance manufacturing divisions. All four codes become effective on Aug. 12.

The maximum hours and minimum wage clauses of the basic code are carried over entirely into the supplements, providing for a 40-hr. week, with certain emergency exceptions and for a sliding scale of minimum hourly wage rates, based upon population, as follows: 40c. in cities of more than 50,000; 38c. in cities of between 10,000 and 50,000 and 36c. in cities of less than 10,000. The rate in the South is 32c.

In the case of all four codes, approval was granted, subject to a stay of the clause providing for a waiting period between the date of filing and effective date of price lists, and in the case of all except that of the concrete mixer division, which contains no such clause, that providing for manufacturer's control of distribution was stayed pending submission of satisfactory evidence covering the distribution of the products of the industry to the administrator.

Additional stays were ordered as follows:

Diesel engine division, clauses designed to closely restrict trade-in allowances and which would forbid "pool buying," pending further order. The proponent association was also ordered to amend its constitution and by-laws regarding membership.

Jack manufacturing division, clause forbidding deviations from price and discount lists in favor of certain customers, stayed for 15 days, and one strictly limiting sales through brokers and one forbidding the acceptance of second-hand equipment as part payment for new stayed pending further order by the administrator.

Railway appliance manufacturing division, section in fair trade practice clause forbidding the supplying of parts, by a member of the industry, other than the maker of an industry product bearing the maker's name or trade mark, so long as the maker is still manufacturing that article, stayed for 15 days, and two others, one forbidding the acceptance of used products of the industry as partial payment of new articles and the other to limit the furnishing any prospective buyer by a member of the industry with detailed drawings of the product of the subdivision, stayed pending further order by the administrator.

* * *

Steel Joist Code Approved

THE NRA has approved the code for the steel joist industry.

In his letter to the President the administrator points out that this industry, like the reinforcing materials fabricating industry, has grown up from a group of specialists engineering organizations developing and promoting the use of various types of steel joists. Its code is drafted along lines similar to the latter industry. While the steel joist industry is small, the public has greatly benefited by its activities in promoting new products and types of construction.

Except in the case of executives, supervisors and technicians receiving $35 a week or more and those employed on emergency work involving breakdowns or requiring protection to life and property, employees of the industry are limited to 40 hr. per week during one-half of the calendar year, except that during seasonable periods a maximum of 48 hr. per week for six weeks in any one-half of the calendar year may be permitted. But not more than 8 hr. in any one day, or more than six days in any one week. Watchmen are limited to 46 hr. a week and clerical employees to 40 hr.

The order of approval eliminates the wage districts in the code, which range from 25c. to 40c. in 21 districts, and establishes minimum rates of 34c. in the South and 40c. an hour elsewhere.

The order also eliminates the provision whereby the code could have been terminated at the will of 90 per cent of the industry.

The industry, for the first 10 months of 1933, operated at about 10½ per cent of the 1929 peak volume, when employes numbered approximately 900. The present employment is about 19 per cent of that number, or 172. To increase employment to the 1929 level it would require the 1933 volume of business and a 36-hr. week.

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Amendment to Anti-Friction Bearing Code

NRA has approved an amendment to the anti-friction bearing code which provides for definite terms of sale designed to prevent destructive price cutting. It becomes effective Aug. 10.

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Oil Burning Equipment, Wire Cloth and Refrigerating Machinery

THE NRA has announced its approval of the following codes:

Industrial Oil-Burning Equipment Manufacturing Industry: This code provides for a minimum hourly rate of 40c., except for handicapped workers when properly certified; and a minimum weekly rate of

...erical and office employees. A ... work-week of 40 hr. is estab... with an exception which provides ... six weeks in each six-month ...orkers may be employed for 48 ... on payment of time and one-... overtime.

... Paper Mill Wire Cloth Manu... Industry: This industry is a ... of the fabricated metal products ...uring and metal finishing and ...ting industry; and the approved ...al code follows the basic code ...ing for minimum hourly rates ...r male and 35c. for female ... the North, and 35c. for male ...r female workers in the South. ...imum work-week is set at 40 hr. ...*erating Machinery Industry* (a ... of the machinery and allied ... industry): This code adopts the ...r and labor provisions of the ..., which include a 40-hr. maxi... work-week and minimum hourly ... upon population.

... was granted subject to a 15-... of four code articles, which ... effective at the end of that ... unless the administrator orders ... The articles cover accounting ..., selling below reasonable cost, ... and unfair trade practices. A ... also required, subject to further ... the administrator, of the clause ... for a waiting period between ... of filing and the effective date ... The code becomes effective ...

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Valve and Fittings Budget

N... has approved a budget for the ... authority of the valve and fit... manufacturing industry. As sub... the budget totaled $94,080. The ...tration's approval, however, ex... item of $6,580 marked for "ex... connection with code presenta... The budget is for the year 1934. ...roved basis of contribution by ... members is .25 per cent of sales ...alendar year 1934.

* * *

...ed Machinery and Equipment Distributing

D... SION of the question of "over... ..." codes, and objections by the ... Labor Advisory Board to amend... ...ffered to the maximum hour pro... featured a hearing on the pro... ...ode for the used machinery and ... distributing trade before As... Deputy Administrator Walter ...

...ode, as proposed by the National ...tion of Used Machinery and ... Dealers, would cover used ... and rubber machinery, food and ...e machinery, electrical machinery, ...quipment, metal woodworking ma..., mining machinery, railroad ma... and equipment, and construction ...ry and equipment.

... code was presented by S. A. De... chairman of the association's code ...ttee. He told the assistant deputy ...istrator there were 876 known es...ments in the industry, of which ...w belong to the association and 220 have signified an intention to join ... code is approved. In 1929, he ... the industry had sales amounting ...7,000,000 and employed 7000 per... In 1933 sales amounted to $18,-..., with 3800 employees. Members of the association handle about 80 per cent of the sales.

As presented, the code provides for a 40-hr. maximum week and 8-hr. day, with certain emergency provisions permitting 48 hr. per week, overtime to be paid for at the rate of time and one-half.

Mr. Dewitt informed the assistant deputy it was the desire of the industry to strike out this section and incorporate, in its stead, the hour provisions of the code for the special tool, die and machine shop industry. These provide for a 40-hr. week and eight 48-hr. weeks in each six months' period, without overtime payment, if "no unemployed workers possessing the necessary skill to perform said production work are available." Emergency work in excess of 48 hr. per week, or 8 hr. per day, would be paid time and one-half.

H. L. Brunson of the NRA Labor Advisory Board offered vigorous objection to the proposed change and the matter was put over for later conference discussions.

The proposed code provides minimum weekly rates of pay based upon population, with $16 the minimum in cities of over 500,000, $15 in cities between 250,000 and 500,000, and $14 in cities of less than 250,000. Provision is made for employing office boys and girls and handicapped persons at less than the minimum prescribed.

The code provides for a code authority consisting of five representatives of the association and two of non-members of the association.

* * *

Administration Members Appointed to Code Authorities

THE NRA has announced the appointment of code authority administration members as follows:

Waterpower Equipment Industry (a division of the machinery and allied products industry)—R. E. Polk, who since 1920 has been connected with the Philadelphia Co. and subsidiary companies, Pittsburgh, Pa.

Hog Ring and Ringer Manufacturing Industry (a division of the fabricated metal products manufacturing and metal finishing and metal coating industry)—Alan Jay Parrish, who has had considerable experience in construction work, as well as in the highway and public works field in Illinois.

Cylinder Mould and Dandy Roll Industry—Major F. H. Miles, Jr., an army officer who has been assigned to special duty in the War Department in connection with army procurement and planning activities.

Diamond Core Drill Manufacturing Industry—A. A. Ainsworth, who for a number of years was general western manager of the David Williams Co., publishers of trade magazines, including THE IRON AGE, with offices in Chicago. Since 1927, when he retired from trade association work, he has been engaged in inventing and developing system filing devices.

* * *

Trade Practice Complaints Committees Approved

TRADE practice complaints committees in three industries have been authorized by the National Recovery Administration, it was announced today, and their plans of procedure approved. They were submitted by the code authorities for the beauty and barber shop mechanical equipment manufacturing industry, the gypsum industry, and the spray painting finishing and equipment manufacturing industry.

In approving the plans for the handling trade practice complaints arising under their codes, minor changes were ordered by the administration in those submitted by the gypsum and spray painting industries, and in the case of the latter it was stated that approval was given on condition that the changes indicated by the Administration be made within 60 days.

Following are the approved committees:

Beauty and Barber Shop Mechanical Equipment Manufacturing Industry—Armand Blatt, president, Nusheen, Inc., New York, N. Y.; J. E. Dwyer, general manager, E. Frederics, Inc., New York, N. Y., and George D. Chisholm (chairman), New York, N. Y.

Gypsum Industry—M. H. Baker (chairman), Gypsum Industry Code Authority, president, National Gypsum Co., Buffalo, N. Y.; C. F. Henning, vice-president, United States Gypsum Co., Chicago, Ill.; R. B. Henderson, president, Pacific Portland Cement Co., San Francisco, Cal.; George N. Lenci, secretary, Ebsary Gypsum Co., New York, N. Y.; James Leenhouts, general manager, Grand Rapids Plaster Co., Grand Rapids, Mich.; and F. D. Hansen, representative of the Administrator, Milwaukee, Wis.

Spray Painting, Finishing and Equipment Manufacturing Industry—W. F. Grandolph (chairman), DeVilbiss Co., Toledo, Ohio.; J. F. Roche, Binks Manufacturing Co., Chicago, Ill.; and H. W. Beach, Eclipse Air Brush Co., Newark, N. J.

Regional committees:

Eastern—Wayne B. Thompson (chairman), Sprayo, Inc., Somerville, Mass.; Willard C. Beach, Willard C. Beach Air Brush Co., Harrison, N. J.; and A. W. Smart, Eureka Pneumatic Spray Co., New York, N. Y.

Midwestern—J. A. Paasche (chairman), Paasche Air Brush Co., Chicago, Ill.; S. Deutsch, The Electric Sprayit Co., South Bend, Ind., and W. C. Gast, Gast Manufacturing Co., Bridgman, Mich.

Pacific Coast—A. F. Sharpe (chairman), Sharpe Manufacturing Co., Los Angeles, Cal.; J. C. Hall, Decora Manufacturing Co., Oakland, Cal.; and H. O. Winkler, Crown Spray Gun Manufacturing Co., Los Angeles, Cal.

* * *

Code Authorities Approved

THE NRA has approved the personnel of code authorities for the contractors pump manufacturing and the wire machinery subdivisions of the machinery and allied products industries as follows:

Contractors pump Manufacturing—J. A. Abbott (chairman), Homelite Corpn., Port Chester, N. Y.; B. F. Devine, Chain Belt Co., Milwaukee; Lion Gardiner, Jaeger Machine Co., Columbus, Ohio; S. M. Hunter, Novo Engine Co., Lansing, Mich.; and A. S. Marlow, Marlow Pumps, Ridgewood, N. J.

Wire Machinery—P. M. Morgan (chairman), Morgan Construction Co., Worcester, Mass.; W. D. Person, Waterbury Farrel Foundry & Machinery Co., Waterbury, Conn.; H. G. Wells, Frank L. Wells Co., Kenosha, Wis.; E. F. Shuster, F. B. Shuster Co., New Haven, Conn.; and L. A. Vaughn, Vaughn Machinery Co., Cuyahoga Falls, Ohio.

Labor Provisions of Proposed Iron Ore Code Are Attacked

WASHINGTON, Aug. 6.—The proposed code for the iron ore mining industry was presented today for public hearing before Deputy Administrator Walter A. Jenssen at the Willard Hotel. Protests against certain of the labor provisions notable with respect to hours of labor and minimum wage rates were made by representatives of the American Federation of Labor and by the sitting members of the Labor Advisory Board of the National Recovery Administration.

The code was submitted by R. C. Allen, Cleveland, chairman of the code committee of the industry. In so doing he said that the membership of the Lake Superior Iron Ore Association, which sponsored the code, comprised about 92 per cent of all the iron ore producers of the United States, and the membership produced about 60 per cent of the total volume. He explained, however, that the association does not include the production of the United States Steel Corpn., that production being under the code for the iron and steel industry. The committee, he stated, had been in constant touch with all the other producers in the preparation of the code and 95 per cent are sponsoring it.

In answer to a question by Deputy Administrator Jenssen, Mr. Allen said that in membership and volume of product the code represents 95 per cent of the iron ore producers of the South. He emphasized, however, that his organization was an independent association and does not include the United States Steel Corpn.

W. C. Holden, representing the American Federation of Labor, said that employment in the industry is approximately ½ of what it was in 1919. The hours now being worked are approximately only 30 per week. Therefore, he declared, there seems to be no justification for a week nearly as long as that provided for in the code. He recommended a 30-hr. week. He also recommended a penalty rate of time and one-half for all hours worked in excess of 30 hr. per week and double time for Sundays and holidays.

Mr. Holden also protested against exception from the minimum hour provision made in the case of executives and those in similar capacities receiving $25 a week in the South. In the North it was $35 a week. He recommended that the exemption be made at $35 a week.

Second Stay Postpones Fabricators' Code

THE effective date of the steel construction code has been postponed a second time, this time until Aug. 16. The first stay expired on Aug. 6. The stays have been granted by the Administration because of the determined opposition of the steel fabricating industry to provisions in the code which would put erection work, always considered an important and integral part of the industry, under the construction code.

Forecasts Dwindling Use Of Iron Ore

DULUTH, Aug. 3.—In the course of a suit under which the local county is seeking to collect $1,750,000 in delinquent taxes on 37 parcels of reserve iron ore bodies on the Mesaba range, Stewart M. Marshall, a consulting engineer, of New York and San Francisco, expressed the opinion that ore demand will remain about stationary over the next 20 years and then will show a decline.

Mr. Marshall, as important factors bearing on the trend, mentioned an increasing use of scrap, steadily declining exports and an increasing use of substitutes for iron and steel. His investigations indicated that iron and steel consumption before the war was growing at a rate of 6.6 per cent per annum but that now the rate is 2.7 per cent.

In respect to dwindling exports, he believes that Canada, which now imports between 80 and 90 per cent of its iron and steel products from the United States, will take less than 50 per cent in future years, partly because of the operation of the British Empire trading agreements. Japan, he added, will be self-sufficient within the next 10 years. "The world as a whole," he said, "is progressing to such an extent that the formerly less advanced countries are becoming producers and therefore the opportunity for exports will be decidedly restricted."

As another important factor tending to reduce the demand for raw materials, Mr. Marshall dwelt on the replacement of heavy units by lighter ones, as typified in the lighter locomotives and rolling stock now appearing on the railroads. He offered figures to show lightening of weights in the construction field of the order of 25 per cent. The lightening of iron and steel structures, he explained, was the result of the use of alloys and the application of welding.

In respect to the rate of growth of the industry, he pointed out that the rate of population growth between 1870 and 1880 was 2½ per cent and between 1920 and 1930, 1.5 per cent, and that the consumption of iron and steel per capita declined from a rate of increase around 9 per cent in 1895 to 2.4 per cent in 1920 and only ½ per cent in 1930.

Battelle to Investigate Electric Furnaces

DETROIT ELECTRIC FURNACE CO., Detroit, makers of electric furnaces, has arranged with Battelle Memorial Institute, Columbus, Ohio, for an investigation of furnace construction and operation. The work at Battelle will be in charge of Harry B. Kinnear, metallurgist, and Chester R. Austin, refractories engineer. The program includes construction and operating features, and is expected to solve some metallurgical problems arising from the various applications of electric furnaces in ferrous and non-ferrous fields, especially in customers' problems.

Welder Manufacturer Opens Detroit Plant

THE Taylor-Winfield Corpn., Warren, Ohio, manufacturer of electric butt, seam and spot welders, has opened a manufacturing plant at Detroit. Located at 14307 Third Avenue, this Detroit factory will have a complete engineering staff and an experimental department; also a machine shop, transformer department, assembly department, and facilities for manufacturing special resistance welders as well as a department for redesigning and rebuilding used equipment. The main plant at Warren, Ohio, will continue manufacture of both standard and special resistance welding equipment.

Japanese Steel Exports Show Large Increase

A REMARKABLE increase in Japan's exports of iron and steel products last year is shown by the figures recently released by the Japanese Ministry of Finance. Exports to Kwantung and Manchukuo, in 1933, constituted 78.5 per cent of the total exports of iron and steel against 67.5 per cent in 1932. The exports in metric tons are given in detail in the following table:

	Kwantung & Manchukuo		Other Countries	
	1932	1933	1932	1933
Bars	16,268	36,225	20,107	45,1[illegible]
Plates and sheets	7,359	9,577	12,888	18,1[illegible]
Wire	5,366	11,748	10,952	22,7[illegible]
Cables	663	1,046	1,052	1,[illegible]
Tubes	6,892	19,291	15,053	29,[illegible]
Scrap	716	1,080	12,486	8,[illegible]
All others	40,133	101,848	42,504	104,[illegible]

July Pig Iron Output Declined 38.6 Per Cent

PRODUCTION of coke pig iron in July declined sharply to 1,224,826 gross tons, compared with the June output of 1,930,133 tons. The daily rate in July, at 39,510 tons, showed a loss of 38.6 per cent from the June rate of 64,338 tons a day. The daily production last month was the lowest since January, which averaged 39,201 tons.

There were 75 furnaces in blast on Aug. 1, making iron at the rate of 35,585 tons a day, compared with 89 furnaces on July 1, operating at the rate of 48,190 tons a day. Eighteen furnaces were blown out or banked during July and four furnaces were blown in. The Steel Corporation blew out or banked six and blew in four, and independent steel companies blew out or banked 12 furnaces.

Among the furnaces blown out or banked are the following: One Edgar Thomson, one Ohio, Carnegie Steel Co.; one South Chicago (old), of the Illinois Steel Co.; three Ensley furnaces, of the Tennessee Coal, Iron & Railroad Co.; one Lackawanna, one Steelton and one Sparrows Point, Bethlehem Steel Co.; one Donner and one Massillon, Republic Steel Corpn.; one Portsmouth and one Riverside, Wheeling Steel Corpn.; one Weirton, National Steel Corpn.; two River furnaces, Corrigan, McKinney Steel Co.; one Otis, Otis Steel Co., and one Midland furnace, of the Pittsburgh Crucible Steel Co.

Furnaces blown in included two Duquesne, one Mingo, of the Carnegie Steel Co., and one Monongahela, of the National Tube Co.

Daily Average Production of Coke Pig Iron

Gross Tons

	1934	1933	1932	1931
January	39,201	18,248	31,380	55,289
February	45,131	19,798	33,251	60,950
March	52,243	17,484	31,201	65,556
April	57,561	20,787	28,430	67,317
May	65,900	28,621	25,276	64,325
June	64,338	42,166	20,935	54,621
½ year	54,134	24,536	28,412	61,356
July	39,510	57,821	18,461	47,201
August		59,142	17,115	41,308
September		50,712	19,753	38,964
October		43,754	20,800	37,848
November		36,174	21,042	36,782
December		38,151	17,615	31,625
Year		36,199	23,723	50,069

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1934	1933	1934	1933
January	1,215,226	568,785	11,703	8,810
February	1,263,673	554,230	10,818	8,591
March	1,619,534	542,011	17,605	4,783
April	1,726,851	623,618	15,418	5,857
May	2,042,896	887,252	10,001	5,948
June	1,930,133	1,265,007	10,097	13,074
½ year	9,798,313	4,441,003	75,642	47,062
July	1,224,826	1,792,452	10,188	18,661
August		1,833,594		16,953
September		1,522,257		13,339
October		1,356,361		16,943
November		1,085,239		14,524
December		1,182,079		9,369
Year		13,212,785		136,852

*These totals do not include charcoal pig iron. The 1932 production of this iron was 15,055 gross tons.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1934	1933	1932
January	7,800	2,602	6,256
February	7,071	2,863	7,251
March	7,197	2,412	7,157
April	8,838	1,908	5,287
May	9,099	3,129	4,658
June	9,459	4,088	6,090
July	7,880	6,783	3,329
August		7,756	3,070
September		10,034	3,213
October		8,634	4,286
November		7,639	4,435
December		8,358	3,674

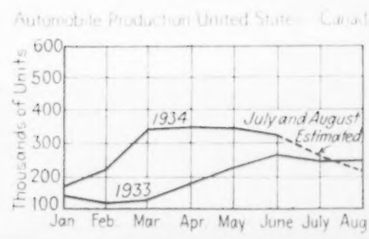
Production by Districts and Coke Furnaces in Blast

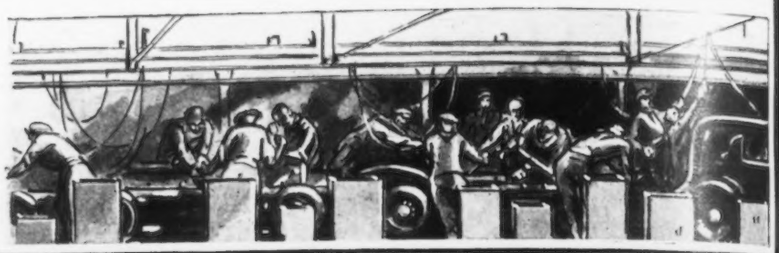
Furnaces	Production (Gross Tons) July (31 Days)	Production (Gross Tons) June (30 Days)	August 1 Number in Blast	August 1 Operating Rate, Tons a Day	July 1 Number in Blast	July 1 Operating Rate, Tons a Day
New York:						
Buffalo	60,015	112,871	4	1,550	5	2,920
Other New York & Mass.	18,991	18,627	2	615	2	620
Pennsylvania:						
Lehigh Valley	25,333	32,555	3	815	3	1,120
Schuylkill Valley	21,458	22,157	2	690	2	740
Susquehanna and Lebanon Valleys	13,260	17,177	0	...	1	375
Ferromanganese	...	...	0	...	0	...
Pittsburgh District	213,978	406,674	13	6,945	13	8,295
Ferro, and Spiegel	16,416	4,083	2	530	1	135
Shenango Valley	14,374	31,891	1	465	1	595
Western Pennsylvania	14,456	34,989	1	465	1	405
Ferro and Spiegel	5,980	6,014	1	195	1	200
Maryland	46,738	80,887	2	1,085	3	2,865
Wheeling District	70,115	125,229	4	1,920	5	2,930
Ohio:						
Mahoning Valley	83,571	198,206	5	2,650	6	4,105
Central and Northern	157,283	225,636	8	3,640	12	6,160
Southern	18,586	39,251	2	475	3	1,215
Illinois and Indiana	241,616	343,341	11	7,510	12	8,450
Wis. and Minn.	58,027	58,364	4	1,870	4	1,945
Mo. and Utah	20,019	19,828	2	615	2	860
The South:						
Virginia	...	...	0	...	0	...
Kentucky	24,351	22,470	2	785	2	750
Alabama	100,279	128,183	7	2,725	10	4,275
Ferromanganese	...	...	0	...	0	...
Tennessee	...	1,700	0	...	0	...
Total	1,224,826	1,930,133	75	35,585	89	48,190

Packard Checks Cylinder Thickness Magnetically

In order to test the thickness of automobile cylinder walls in regular production work, the Packard Motor Car Co. has developed a device which is lowered into each bore and determines the thickness by means of magnetic force. Previously the only way such measurements could be secured was by breaking or sawing the cylinder block into pieces. This non-destructive testing device is merely an electric magnet with a meter which measures the electric current necessary to energize the magnet. The greater the volume of steel present, the greater magnetic force is needed to hold the metal to the magnet.

Revere Copper & Brass, Inc., New York, has opened an office at 911-912 Rhodes-Haverty Building, Atlanta, Ga., in charge of Walter W. Fitts as district representative.





THIS WEEK ON THE

Postponement of Models Not Encouraging to Suppliers

DETROIT, Aug. 7.

ALTHOUGH immediate prospects for the automobile industry appear reasonably bright, with a production this month which should exceed 200,000 units, the long-range view is not so promising from the standpoint of the supplier of materials and parts. Evidence is accumulating that car manufacturers will go along with present models until late in the year with final decisions on details of 1935 lines postponed until the last possible moment.

Fall showings of new cars will be few in number. It is believed that most companies will hold back their products until the New York show early in January or until within a week or two of the show. Apparently after all the suggestions for changes in annual show arrangements and dates had been sifted, the industry decided to do little to disturb the plan which long has prevailed. The New York and Chicago shows, under the management of dealers rather than the N.A.C.C., still will be the focal points for the inauguration of the year's selling campaign in 1935. The local shows around the country will be held as usual. The proposed Detroit show exclusively for dealers late in the year has been abandoned. One of the main reasons is the fact that no factory cares to have its dealers gather in Detroit "on their own" and be exposed to the proselyting activities of competitors.

Perhaps typical of the attitude of most manufacturers in deciding to carry on with present models for several more months is that of the Chevrolet Motor Co. It is concentrating its efforts on sustaining retail sales at the highest possible level in the next three months and is planning on assembling 1934 cars well into October. Last year it cleaned up its production run in September, but was caught short of cars in the final quarter. It doesn't intend to make that mistake again.

Chevrolet Has Ambitious Program

Chevrolet made slightly less than 93,000 cars in July and is proceeding on a schedule of 80,000 cars for August and 60,000 for September. This is an ambitious program for the season of the year when factory activities usually are rapidly waning. Unless this program is subsequently cut, by the end of September Chevrolet will have assembled approximately 760,000 units since Jan. 1. Up to July 31 its production this year totaled about 618,000 units.

It is Chevrolet's avowed intention to see that its dealers are adequately stocked with cars when 1935 models are announced, thus avoiding a repetition of its experience early this year when its retail outlets were practically devoid of passenger cars for two to three months. For this reason Chevrolet should suffer a severe letdown only for about 30 days, probably starting about the middle of October, with a resumption of operations on a substantial scale in the final 45 days of the year. On this assumption, Chevrolet is likely to make 850,000 cars during 1934.

Despite its high output recently, Chevrolet is understood to have only about 50,000 cars in the field, whereas a normal stock is around 70,000. While official figures are not yet available, it is said on good authority that Chevrolet's domestic sales during July may have exceeded those in June.

Retail Sales Well Distributed

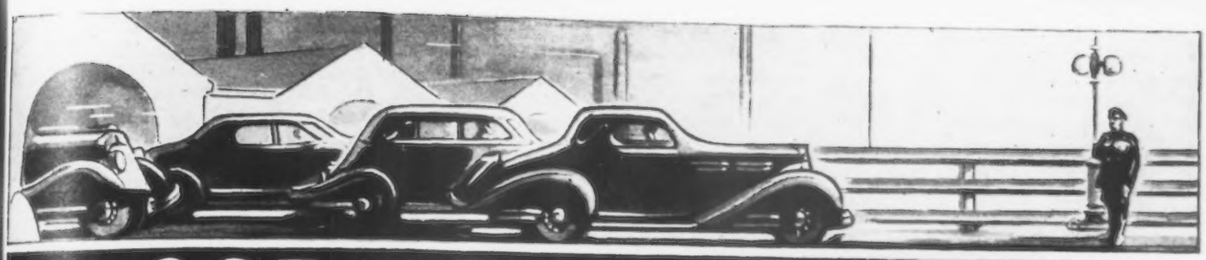
The question on the lips of automotive men is, "Who are buying all the new cars?" The Big Three—Chevrolet, Ford and Plymouth—are still turning out cars at a lively clip, and the industry itself is wondering where the purchasing power is coming from to absorb cars in such large volume. Despite uncertainties of all kinds—international, political, industrial and financial—the fact remains that people are buying new cars and that sales are fairly well distributed throughout the country.

Much has been written about the effects of the drought on new car sales, but the truth is that this retarding influence is not so important as sometimes pictured. The drought has been a spotty affair, even within the confines of a State. Some sections have been devastated by its withering blight, but other sections are benefiting from higher prices and increased demand as a result of the misfortunes of neighboring regions. Then one should not pass over the fact that Federal Government checks in payment for crop restrictions have been pouring into drought districts for the last two or three months, giving many farmers more money than they would have received if they had had bountiful crops and no Government money. This money, fortunately, has been spent almost as soon as received for new automobiles, farm implements and other products.

Sales Brisk in Southwest

The Southwest, in a territory including New Orleans, Oklahoma City, Dallas, Houston, Fort Worth, Galveston and El Paso, continues relatively the best section in the United States from the standpoint of retail sales, according to the testimony of one of the largest automobile manufacturers.

While passenger car sales have been holding tenaciously above the 200,000-a-month mark, they seem likely to fall off considerably this



ASSEMBLY LINE

By BURNHAM FINNEY
Detroit Editor, THE IRON AGE

month. The industry as a whole has ample stocks in the field at present, although the situation varies sharply with individual manufacturers. Whereas Chevrolet has less than a normal number of cars in dealers' hands, another prominent car company is said to have field stocks totaling close to 100,000 units.

With most companies cleaning up current production runs in September or early October, the consensus of opinion in Detroit is that the industry will probably have its poorest month of the year in October, although that dubious honor may go to November. Stocking of dealers will start in the latter half of November or around Dec. 1. Admittedly the foregoing statements are hazardous predictions, dependent on a number of uncertain factors including the ever-present possibility of labor trouble.

The feeling is growing that the steel trade is relying on false hopes if it expects to get tonnage in large volume from car makers either this month or the early part of September. There will be some buying in August, notably by Chevrolet and possibly Fisher Body, but most of it will be for current models. September will see a little more activity, with orders placed for steel for die try-outs and for the first runs on the few cars, such as Pontiac, which are slated for fall debuts. However, it seems doubtful that steel mills can count on major support from the automobile industry until about Oct. 1.

Packard Inquiring for Tools

What amount of business the machine tool trade is likely to get from the automobile people in the next few months is pretty much a puzzle. Packard is a case in point. It has asked for bids on new machine tools for its proposed light eight which would involve expenditures of well over a million dollars, but there is no assurance that any of this equipment will actually be purchased. Packard is said to be getting three sets of figures: one on new equipment to build parts for the new car in its own plant, another on the rebuilding of used machinery to do the same job, and a third on letting a considerable amount of work to outside parts suppliers.

Packard may give a contract to Warner Gear for manufacture of the transmission, according to local reports. It is said to have been figuring with Lycoming for the building of the engines, although the motor for the regular series of Packard cars has always been made at the Packard plant. Apparently no decision has been made regarding the exact course to be pursued.

G.M. and Chrysler Seeking More Profits per Unit

What General Motors and Chrysler divisions will do in the purchase of new equipment is not known. Both corporations are faced with the unpleasant fact that their profits per car were much less in the first half of 1934 than in the corresponding period of last year, despite a handsome gain in volume of business. There are several possible ways in which this situation may be corrected. One is to increase retail car prices, but the public already has shown conclusively that it will not stand for higher prices. A second way is to expand retail markets, thereby achieving higher sales volume and lower production costs per unit. Even if due allowance is made for the most pessimistic of our economic prophets, the automobile industry believes that 1935 will bring a considerable improvement over 1934, just as this year the increase over 1933 has been considerable.

A third way is to cut unit costs by installation of modern machine tools. It is not known whether either General Motors or Chrysler will utilize on a large scale this method of reducing costs, but it is admitted that the policy of the national administration of discouraging industry from making more than a meager profit is hardly conducive to the outlay of large capital sums in an effort to secure further production economies.

Ford has been buying special machines for the Rouge plant and is perhaps the steadiest purchaser of equipment today in the automobile industry. Its policy apparently has been directed toward plugging up weak holes in its production line, where obvious savings can be made by installation of new tools.

Ford to Make Car in France

Ford is reported to have concluded an agreement with Mathis, the French car manufacturer, whereby a Ford car will be made at the Mathis plant in France. Preliminary conversations looking toward this agreement were first published in this column some weeks ago. At that time it was thought that the Ford model 44 might be built by Mathis, but it now develops that the present V-eight Ford will be manufactured. Practically all the parts for the car, including the V-eight motor, will be made in France because of the restrictions of the French government on imports. It is understood that some machinery will be shipped from Ford's Rouge plant to the Mathis factory, but whatever new equipment must be bought will be purchased from French machine builders unless it should be of the type which is not manufactured in France. It is said that some of the machinery to be shipped from the Rouge plant is that which originally was built for the model 44 job and which recently has been converted for work on model 40.

Packard Rearranges Plant

Preparing to start production shortly on its regular line of cars, Packard has rearranged the northern division of its plant so as to be able to make 9100 units annually operating one shift a day five days a week. Manufacturing activities are being concentrated in smaller areas. Bodies for the large cars, for example, will be built in 73,000 sq. ft. of floor space, whereas formerly this work occupied 524,000 sq. ft. Production operations on the small car, largely centered in the portion of the plant south of Grand Boulevard, are being set up on the basis of 100,000 units a year. The Packard plant formerly was geared to turn out 50,000 cars annually on a 9-hr. day schedule.

All divisions of Chrysler Corpn. have scheduled a total of 45,000 units for August. Plymouth turned out about 34,000 cars in July. Buick made 9650 units last month and expects to build 7341 cars in August. Oldsmobile and Studebaker assembled 10,500 units and 4500 units respectively last month.

During the first seven months of the current year Dodge dealers sold 146,885 Plymouth and Dodge passenger cars and Dodge trucks, compared with 90,334 units in the corresponding period of last year.

Financial reports of General Motors and Chrysler for the first half of the year, topped by the extra dividend declared on Monday by the former, call attention to the fact that practically all the profits in the automobile industry this year have been confined within the limits of the big three—Ford, General Motors and Chrysler. The past year has taken heavy toll of the independents. Willys-Overland, Franklin and American Austin are in receivership. Other companies have sustained losses.

Negotiations for Merger Under Way

It may be that a merger of two or more of the independent companies will provide one way out of the present unsatisfactory situation. Auburn and Pierce-Arrow, together with a company in Michigan, are reported to have conducted conversations in Chicago the past week with a three-way merger as the goal. E. L. Cord is said to be the moving force in this proposed consolidation, which apparently is far from being achieved. Unless an agreement can be reached before the companies get too far along on 1935 models, negotiations are likely to fail.

A. O. Smith Corpn. is understood to have been awarded half of Plymouth's frame business for 1935, the other half going to Midland Steel Products Co. The latter has been supplying all of Chrysler's frame requirements recently.

All-Steel Custom Body Produced

In its Chrysler custom Imperial cars Chrysler engineers, together with the Lebaron-Detroit Co. custom body division of the Briggs Mfg. Co., have made available an all-steel custom body for the first time in the history of the automobile industry. Four body styles on a chassis of 146 in. and one on a wheelbase of 137 in. are equipped with an all-steel custom body, thus giving the entire Chrysler Airflow line the all-steel type of construction which was used on the Airflow Eight and the Airflow Imperial from the first. Body frame and sill are welded into one unit, which is of fused girder type construction. Body panels and cross members are electrically welded, trussed and braced with steel at points of stress. The all-steel custom body is regarded as an improvement on the wood-and-steel body in appearance, rigidity, strength and quietness, with a factor of safety impossible in any but all-steel construction.

Pattern Makers Strike

Local jobbing foundries specializing in automotive dies have been awarded considerable work in the last two weeks and seem not at all hampered by the strike called last week by the pattern makers' local of the American Federation of Labor. About 600 pattern makers are said to have walked out on Wednesday morning when tool and die job shops refused to grant their demand for an increase in wages of 20 per cent. Pattern makers in automobile plants are still at work, not yet being affected by the controversy. The pattern makers' union claims a membership of 1800 in Detroit.

Automobile Workers Secede in Large Groups from American Federation

DETROIT, Aug. 7. — Dissension within the ranks of the automobile workers' Federal union of the American Federation of Labor, which has been apparent under the surface of several months, has come into the open with the withdrawal in the last few days of the Oldsmobile and Hudson locals from the organization and with a demand by the Detroit Federation of Labor for removal of William Collins, national representative who has had charge of the unionization campaign in the automobile industry during the past year.

The revolt first came to public attention with the secession of a dissatisfied group in the Oldsmobile local at Lansing, which promptly formed the Associated Automobile Workers of America as a new national automobile union independent of the Federation. On Monday members of the Hudson local, led by Arthur Greer, announced their withdrawal from the Federal Automobile Workers' Union and their affiliation with the new union, and today the local unions at the Pontiac, Fisher Body and General Motors truck plants in Pontiac are threatening to follow the lead of the Oldsmobile and Hudson locals. Alarmed at the possible loss of some 14,000 members from the Federation in less than a week's time the Detroit Federation of Labor has asked President William Green of the American Federation of Labor to remove Mr. Collins.

In April the Federal local union at the Chevrolet and Fisher Body plants in St. Louis withdrew from the Federation and rumblings of dissatisfaction have come from other locals in recent months. The present trouble had its origin in differences of opinion between two groups in the Federal automobile union regarding the broad policies to be pursued in the unionization of the automobile industry. It is reported that the Detroit Federation of Labor planned last year to start a drive in the automobile industry at the time that Mr. Green took matters into his own hands and organized an independent campaign under the direction of Mr. Collins. This action on Mr. Green's part is believed to have been resented by Frank X. Martel, president of the Detroit Federation, who has been supreme in Federation circles in Detroit for years. Incidentally Mr. Martel is understood to be a follower of John L. Lewis, giving his support to the Federation's so-called left wing.

A certain group in the Federal automobile union long have been critical of the leadership of Mr. Collins. They apparently have wanted an independent international automobile workers' union established, which, while affiliated with the American Federation of Labor, would largely govern itself. This idea has been frowned upon by Mr. Green, who personally attended the first national conference of the Federal automobile union in Detroit in June and, with the assistance of Mr. Collins, put through a plan for establishment of a national council to rule the Federal automobile union under strict supervision from the Federation offices in Washington.

The withdrawal of the Oldsmobile and Hudson locals is the direct outgrowth of this action, for Mr. Greer, president of the Hudson local, is reported to have vigorously opposed the national council plan.

The attitude to be taken toward Richard Byrd, labor's representative on the Automobile Labor Board, is another source of contention between the two opposing groups. Ever since the organization of the labor board, Mr. Collins and other leaders in the Federal automobile union have been increasingly critical of the conciliatory policy of Mr. Byrd, the matter finally coming to a head with the passage of a resolution by the newly-formed national council asking President Roosevelt to remove him. Mr. Greer and other dissenters have

(Concluded on Page 57)

Government's Emergency Canning Program Stimulates Tin Plate Production

Rise In Needs of Can Companies Helps Lift Ingot Output From 26 to 27½ Per Cent—Scrap Prices Break at Chicago

THE unusual severity of the drought in the Prairie States has thrown a heavy shadow over business prospects in the iron and steel industry. The losses suffered by the agrarian States are far too heavy to be offset by Government aid, but the emergency moves taken by the Administration to slaughter and can 7,000,000 head of cattle are proving of temporary benefit to steel producers. The containers required for this program will call for close to 175,000 tons of tin plate.

The can companies may draw on their stocks to supply part of this demand, but the mills will unquestionably be called upon for a large tonnage. Specifications for tin plate have already rebounded, and tin mills have raised their production from 45 to 65 per cent of capacity. Semi-finished mills have stepped up operations to increase their output of tin bars and open-hearths have been called upon to supply more raw steel.

LARGELY as a result of the sudden spurt in tin plate demand, ingot output has risen three points to 19 per cent at Pittsburgh and two points to 37 per cent in the Valleys. There have also been gains of two points to 24 per cent in the Cleveland-Lorain area, one point to 22 per cent in the Philadelphia district, and 16 points to 25 per cent in the South. Operations are unchanged at 31 per cent at Chicago, 30 per cent at Buffalo, 27 per cent in the Wheeling district and 75 per cent at Detroit.

The national rate of steel production has risen from 26 to 27½ per cent of capacity. Whether further gains will be made depends on continuance of the increased flow of tin plate tonnage and a revival of buying in other lines.

ALTHOUGH there will be some additional buying of steel this month by the automobile industry, it will be restricted mainly to fill-in tonnages for current models. No large purchases of steel for new models are expected until the latter part of September.

Government-sponsored rail and track accessory orders will be completed at Pittsburgh by mid-August and at Chicago before Sept. 1. No important new railroad equipment programs are being launched.

In the construction field hopes are centered on a speeding up of PWA work. Structural steel lettings, at 8800 tons, compare with 11,150 tons last week and 15,150 tons two weeks ago. Contracts for July, at 46,500 tons, were the lowest for any month this year and compare with 82,725 tons for June and 87,350 tons for May.

THE most depressing aspect of the market is the failure of replenishment buying to make its appearance. There has been a marked slowing up of the tempo of industrial activity and inventories accumulated by consumers in June are lasting longer than had been expected.

This fact, together with a fuller realization of the extent of drought damage, has weakened sentiment in the scrap market, particularly in the Chicago district, where there have been rather general price reductions. As a result of the break at Chicago, THE IRON AGE composite for heavy melting scrap has declined from $10.42 to $10.33 a ton, a new low for the year.

It is difficult to believe, however, that consumption of iron and steel has fallen as much as production. That output was artificially stimulated by anticipatory accumulations of stock prior to July 1 seems only too evident from the production figures. Pig iron output in July, at 39,510 tons per day, showed a decline of 38.6 per cent from the June daily rate of 64,338 tons. The falling off in steel ingot production was even more severe, the recession of July from June being 49 per cent. The number of blast furnaces active Aug. 1 was 75 as compared with 89 on July 1, a reduction that points to a further shrinkage in pig iron production in the current month.

JULY was the first month this year in which pig iron and steel output failed to exceed production in the corresponding month of 1933. Pig iron output last month was 31.6 per cent lower than in July, 1933. Steel ingot output was 53.5 per cent below that of July a year ago.

Comparisons of the first seven months of the year with the corresponding period in 1933 are more favorable. The gain this year in steel ingot production was 46.6 per cent; in pig iron, 76.8 per cent.

THE IRON AGE composite prices for pig iron and finished steel are unchanged at $17.90 a ton and 2.124c. a lb. respectively.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

	Aug. 7 1934	July 31, 1934	July 10, 1934	Aug. 8, 1933
Per Gross Ton:				
No. 2 fdy., Philadelphia	$20.26	$20.26	$20.26	$17.34
No. 2, Valley furnace	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti	19.13	19.13	19.13	17.73
No. 2, Birmingham†	14.50	14.50	14.50	13.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	17.00
Basic, del'd eastern Pa.	19.76	19.76	19.76	17.09
Basic, Valley furnace	18.00	18.00	18.00	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.89
Malleable, Chicago*	18.50	18.50	18.50	17.00
Malleable, Valley	18.50	18.50	18.50	16.50
L. S. charcoal, Chicago	24.04	24.04	24.04	23.17
Ferromanganese, seab'd carlots	$85.00	$85.00	$85.00	$82.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.27½	$36.37½	$36.37½	$40.00
Light rails, Pittsburgh	35.00	35.00	35.00	30.00
Rerolling billets, Pittsburgh	27.00	27.00	27.00	26.00
Sheet bars, Pittsburgh	28.00	28.00	28.00	26.00
Slabs, Pittsburgh	27.00	27.00	27.00	26.00
Forging billets, Pittsburgh	32.00	32.00	34.00	31.00
Wire rods, Pittsburgh	38.00	38.00	38.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.70	1.60

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.80	1.80	1.80	1.60
Bars, Chicago	1.85	1.85	1.85	1.70
Bars, Cleveland	1.85	1.85	1.85	1.65
Bars, New York	2.13	2.13	2.13	1.95
Plates, Pittsburgh	1.80	1.80	1.80	1.60
Plates, Chicago	1.85	1.85	1.85	1.70
Plates, New York	2.08	2.08	2.13	1.898
Structural shapes, P'gh	1.80	1.80	1.80	1.60
Structural shapes, Chicago	1.85	1.85	1.85	1.70
Structural shapes, New York	2.05¼	2.05¼	2.10¼	1.86775
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.70
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	1.65
Cold-rolled strips, P'gh	2.60	2.60	2.60	2.25

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.45	2.00
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.55	2.10
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	2.85
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	2.95
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.65
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.75
Wire nails, Pittsburgh	2.60	2.60	2.60	2.50
Wire nails, Chicago dist. mill	2.65	2.65	2.65	2.15
Plain wire, Pittsburgh	2.30	2.30	2.30	2.10
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.15
Barbed wire, galv., P'gh	3.00	3.00	3.00	2.80
Barbed wire, galv., Chicago dist. mill	3.05	3.05	3.05	2.85
Tin plate, 100 lb. box, P'gh.	$5.25	$5.25	$5.25	$4.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$11.75	$11.75	$11.75	$14.00
Heavy melting steel, Phila.	10.00	10.00	10.50	12.00
Heavy melting steel, Ch'go	9.25	9.50	9.50	10.75
Carwheels, Chicago	9.50	9.50	9.50	10.50
Carwheels, Philadelphia	11.25	11.25	12.50	12.75
No. 1 cast, Pittsburgh	12.25	12.25	12.25	11.75
No. 1 cast, Philadelphia	11.75	11.75	11.75	12.50
No. 1 cast, Ch'go (net ton)	8.00	8.50	7.25	10.50
No. 1 RR. wrot., Phila.	11.25	11.25	11.25	12.00
No. 1 RR. wrot., Ch'go (net)	7.25	7.25	7.25	9.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.85	$3.85	$3.85	$2.75
Foundry coke, prompt	4.60	4.60	4.60	3.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery‡	8.75	8.75	8.75	8.75
Lake copper, New York‡	9.12½	9.12½	9.12½	9.00
Tin (Straits), New York	51.75	52.12½	51.87½	44.60
Zinc, East St. Louis	4.30	4.30	4.35	5.00
Zinc, New York	4.65	4.65	4.70	5.37
Lead, St. Louis	3.60	3.60	3.60	4.35
Lead, New York	3.75	3.75	3.75	4.50
Antimony (Asiatic), N. Y.	8.12½	8.12½	7.75	7.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. ‡Blue Eagle copper.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Aug. 7, 1934	2.124c. a Lb.	$17.90 a Gross Ton	$10.33 a Gross Ton
One week ago	2.124c.	17.90	10.42
One month ago	2.131c.	17.90	10.58
One year ago	1.959c.	15.94	12.25
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low	High	Low	High	Low
1934	2.199c., April 24;	2.008c., Jan. 2	$17.90, May 1;	$16.90, Jan. 27	$13.00, Mar. 13;	$10.33, Aug. 7
1933	2.015c., Oct. 3;	1.867c., April 18	16.90, Dec. 5;	13.56, Jan. 3	12.25, Aug. 8;	6.75, Jan. 3
1932	1.977c., Oct. 4;	1.926c., Feb. 2	14.81, Jan. 5;	13.56, Dec. 6	8.50, Jan. 12;	6.42, July 5
1931	2.037c., Jan. 13;	1.945c., Dec. 29	15.90, Jan. 6;	14.79, Dec. 15	11.33, Jan. 6;	8.50, Dec. 29
1930	2.273c., Jan. 7;	2.018c., Dec. 9	18.21, Jan. 7;	15.80, Dec. 16	15.00, Feb. 18;	11.25, Dec. 9
1929	2.317c., April 2;	2.273c., Oct. 29	18.71, May 14;	18.21, Dec. 17	17.58, Jan. 29;	14.08, Dec. 3
1928	2.286c., Dec. 11;	2.217c., July 17	18.59, Nov. 27;	17.04, July 24	16.50, Dec. 31;	13.08, July 2
1927	2.402c., Jan. 4;	2.212c., Nov. 1	19.71, Jan. 4;	17.54, Nov. 1	15.25, Jan. 11;	13.08, Nov. 22

Steel Production Rises at Pittsburgh and Youngstown

Increase Almost Wholly Due to Unexpected Expansion of Tin Plate Requirements — Scrap Prices Unchanged in a Becalmed Market

PITTSBURGH, Aug. 7.—Raw steel output in the Pittsburgh area has risen three points this week to 19 per cent of capacity. In the Valleys and nearby northern Ohio mills production has advanced two points to 37 per cent. The Wheeling district remains unchanged at 27 per cent.

The increases at Pittsburgh and in the Valleys cannot be traced to any general improvement in steel demand, but are due chiefly to sharply increased specifications for sheet bars for conversion into tin plate. This more or less unexpected development represents the first benefit to tin plate mills of the Government-sponsored program for slaughtering a maximum of 7,000,000 head of cattle for canning and distribution to the unemployed. Although the potential demand for tin plate is estimated at about 175,000 tons, producers are not sanguine that the demand created will reach that high, particularly in the face of heavy consumer stocks that will undoubtedly be liquidated during the remainder of the slaughtering and packing program.

The boost in ingot output is, therefore, not significant. When a review is made of general steel business in the past week, almost all major consuming lines have failed to increase their takings since Aug. 1, and in many cases have curtailed specifications. Hand-to-mouth buying policies are the general rule. Steel departments, with the exception of tin plate, are thus finding it increasingly difficult to plan operating schedules more than a week ahead. Some hope for early replenishment buying is derived from reports of a fair movement out of jobbers' stocks during July. But the big three—construction, railroads and the automotive industry—are currently problematical factors in gaging prospects for early steel consumption.

Tin plate production this week will average around 65 to 70 per cent. Sheet mill operations are barely 20 per cent, while strip is only slightly better at 25 per cent.

Pig Iron

Shipping releases and orders have not picked up thus far in August. Producers are not very hopeful that any measureable improvement will be noticed this month in the face of extremely low activity among non-integrated steel mills and foundries. Although inventories are generally scant, consumers are not disposed to depart from hand-to-mouth purchasing schedules. Despite the lack of business, prices appear to be firm.

Semi-Finished Steel

Aggregate movement of semi-finished grades has slackened slightly since the beginning of the month. The lag is particularly noticeable in wire rods, skelp, tube rounds, billets and, to a lesser degree, in sheet bars. Shipments of tin bars are somewhat irregular, although total volume is not particularly unchanged.

Bolts, Nuts and Rivets

Small specifications from jobbers comprise the major activity in this market. A producer in this district has been formally awarded an order for about 450 tons of spikes for the New York Board of Transportation.

Rails and Track Accessories

Federal-sponsored rail and track accessory orders will be completed by Aug. 15. After these final shipments are dispatched, backlogs of producers here will be discouragingly low. At the moment, the outlook for new tonnage sufficient to promise sustained operations is not very hopeful.

Bars

Most mills are starved for new orders and are experiencing difficulty in scheduling operations based on the extremely meager releases against third quarter contracts. Hopes are still pinned on the automotive industry's plans for production on 1935 models. Meanwhile miscellaneous spot business is barely maintaining the pace of July volume.

Reinforcing Bars

With shipments out of jobbing stocks reported to be in fairly good volume, producers are hopeful that some replenishment buying will soon be due. A fairly large tonnage is pending for public works projects, but the path to actual orders for reinforcing steel is cluttered with considerable red tape, and unless some awards are received soon, some work may have to be deferred until next spring. In the immediate district, 110 tons will be needed for the St. Bernard's R. C. Church, for which Metzger-Richardson Co. is the general contractor. A 200-ton lot will have to be purchased for a road project in Bedford County, for which R. D. Thomas & Co. is the general contractor.

Warehouse Business

Hot-rolled annealed sheets, No. 24 gage, in 25 or more bundles have been reduced $1 a ton to 3.30c., base per lb., out of Pittsburgh warehouse. Business since the end of July has not improved.

Cold-Finished Steel Bars

Releases and new orders since the close of last month have diminished. Liquidation of jobbers' stocks in July is reported to have been unusually good, and some restocking business is in prospect later this month. Manufacturing lines, including agricultural implements and business machines, are not important factors in the immediate outlook, which centers chiefly on the motor car industry.

Plates and Shapes

Order books of plate and structural mills in this district are not being fattened by new business, nor are specifications in the offing promising as to important tonnage. The plate market, particularly, is colorless, with little work of any character tending to stimulate activity. Tank work and railroad equipment construction have not drawn much tonnage from this district, while barge repair work has not been of sufficient scope to take up the slack in other directions. Structural mills here are operating almost entirely on backlog tonnage. Structural steel awards in the past week were scattered; fresh inquiries were few and usually for small tonnages.

Tubular Products

Reduced schedules at most tube mills have followed a diminishing demand for practically all grades of tubular goods. Several line pipe projects which had offered signs of reaching a definite point have been either indefinitely postponed or abandoned. In one case, establishment of a favorable freight rate dispelled plans to lay a new oil pipe line. In other instances, elusive capital has been the chief drawback.

Wire Products

Manufacturers' wire and spring wire are very quiet. While orders for wire products from agricultural districts in the Central and Western sections have been reduced by drought conditions, a pickup in orders for barbed wire has been noted, particularly from some Southwestern sections to which cattle have been driven

for relief from the arid conditions existing in other regions.

Sheets

Failure of demand to improve has held operations in the sheet industry at barely 20 per cent of capacity. Automobile tonnage is coming in very slowly, as are orders from other major consuming industries. Galvanized sheets have naturally suffered from curtailed consumption in certain drought areas. Prospects for improvement in August are considered slim. There is a general liquidation of consumer stocks in progress, including the automotive industry, and sellers are more or less resigned to await a normal replenishment demand, the appearance of which is difficult to predict.

Tin Plate

Again tin plate is playing the star role in the steel industry. Running counter to trends in all other steel departments, tin plate mills this week have boosted operations to about 65 per cent of capacity. A rate of 60 per cent was reached at the close of last week. The stimulus for this quickened pace, however, was somewhat unexpected. A Federal-sponsored movement, which has as its goal the slaughtering of a maximum of 7,000,000 head of cattle for canning and distribution to unemployed, has already accounted for a sharp pickup in tin plate specifications. Measured in terms of tin plate tonnage, the Government program, if it should materialize fully, would create a demand for almost 175,000 tons. But the fact that heavy tin plate stocks are in the hands of canners must not be overlooked, and it would be logical to assume that canners would supply from stock a fair share of the business growing out of the Government's program. With specifications well distributed in the past and current weeks, most mills are participating in the improvement.

Strip Steel

Although aggregate volume is light, orders in the past week were fairly well diversified. Incoming tonnage, however, fluctuates from day to day, and intermittent operations are the general rule. Schedules for the strip industry this week will likely not exceed 25 per cent of capacity.

Scrap

This market is becalmed. Although trade sentiment is mixed, with some brokers leaning toward the weak side, no open breaks in the price structure have appeared. In fact, most dealers here are not disposed to press sales at current prices, in the belief that it would be very difficult to cover more than a moderate tonnage at going quotations. Some brokers with unfilled orders are not able to cover freely at present prices. Machine shop turnings are notably scarce, with some dealer bids reported as high as $7.75 and $8. All prices, however, are nominally unchanged. A fair indication of scrap values will probably be provided this week, when awards against the Pennsylvania Railroad and Baltimore & Ohio lists will be made. In the Youngstown district a reported sale of No. 1 heavy melting steel at $11, delivered, reflects a slightly weak position there.

Coal and Coke

Lake movement of slack is slightly improved. Demand for steam coal and other industrial grades, however, continues to drag bottom. Shipments of foundry coke are being retarded by sharply reduced melts among local foundries. Furnace coke is likewise in poor demand.

Reinforcing Fabricators Wages On 1923-29 Level

THE April report of the code authority, reinforcing material fabricating industry, shows that the hourly wage is approximately what it was in 1923 to 1929. Also, the hourly wage shows an increase of 32.4 per cent over the first half of 1933. The number of employees in the industry receiving less than the minimum wages prescribed in the code is negligible and only a small number of employees have worked more than the maximum hours or days per week prescribed in the code. In all cases rush work resulting from unusual peak loads of the fabricating business accounts for the maximum hours or days being exceeded.

Drouth Clouds Outlook At St. Louis

ST. LOUIS, Aug. 7.—The market for finished iron and steel is exceedingly quiet, with virtually no contracting for future delivery and only a small amount of specifying. Added to the fact that specifications previously had been heavy, is the drouth, which threatens to curtail the purchasing power of the farmers and industries dependent upon them.

The modified plans for the St. Louis post office will require an estimated tonnage of 7000 tons of structural steel and 1500 tons of reinforcing bars.

The pig iron market continues in the doldrums as far as sales and shipments are concerned. District melt, however, is said to be fairly well maintained at levels which have prevailed during the last few weeks. Foundries catering to the agricultural implement trade believe that the drouth will affect their business to some extent, but despite this are said to be expecting a greatly improved trade this fall. The stove industry also has some fears as to the effect of the drouth on its sales.

Scrap is quiet following an active week, and prices continue nominally unchanged. The St. Louis-San Francisco's list of 4000 tons, principally scrap rails, was sold for export.

New Bridge Programs Announced on Coast

SAN FRANCISCO, Aug. 6.—President Roosevelt's inspection tour of the $31,000,000 Bonneville project and to the $63,000,000 Grand Coulee dam focused the attention of the coast on the two major Federal construction undertakings in the Northwest. Formal award of the general contract for the Bonneville navigation lock and powerhouse sub-structure had been made just previous to his arrival.

During the week both Federal and State highway bridge programs, which call for an estimated expenditure of $15,213,215, have been announced for the present fiscal year. After a delay of many months the Federal Government has called for bids on a number of new post offices. Although only minor steel tonnages are involved in those advertised, the trend is heartening at a time when industrial construction is entirely absent.

Structural bookings have been light and few new projects have been added to the pending list. It is reported that the Ingalls Iron Works took 850 tons of structural steel for a wharf and transit shed at Stockton, Cal. The United States Cast Iron Pipe & Foundry Co. has been awarded 698 tons of pipe for a water system at Gilroy, Cal. Mill operations are at a minimum and warehouse sales have resumed summer normalcy.

Wheeling Steel Corpn. and subsidiary companies report net profit for the second quarter of $1,134,511, equal, after dividend requirements on 6 per cent preferred stock on which there is an accumulation of unpaid dividends, to $1.39 a share on 402,301 shares of common stock. This compares with net loss of $58,233 in the preceding quarter. For the first six months the corporation operated at a net profit of $1,076,178. Net profit in the second quarter last year amounted to $482,143, and net loss for the first half of 1933 was $320,276. The second quarter was the most profitable period enjoyed by the corporation since 1929.

Chicago Outlook Dimmed by Extent of Drought Damage

But Ingot Rate Holds at 31 Per Cent of Capacity—Rail Run to End Soon—Scrap Declines

CHICAGO, Aug. 7.—The Prairie States remain in the grip of drought and hot weather. By no stretch of the imagination does it seem possible that Government aid can overcome the handicap to business resulting from the destruction of crops and the enforced slaughter of half-starved cattle. Only unusually heavy precipitation can restore sufficient subsoil moisture to brighten the outlook for a satisfactory crop next year.

Notwithstanding this situation Chicago steel mills are holding output at 31 per cent of capacity, though operations are more variable and the near future is uncertain. Rail mills still have about two weeks of work and, unless additional tonnage comes in, will be forced to close before the end of this month.

Many reports are heard of tonnage to come from Government expenditures, but a survey reveals the fact that only a proportionately small part of it will directly benefit this district. At the moment the outstanding developments of this kind are the two dams that are to be built across the Mississippi River.

The scrap market is turning sharply weaker, and the trade now expects it to be inactive during the next 30 days. Heavy melting steel is off 25c. to $9.50 a ton at the top, and other grades are being pressed downward.

Pig Iron

Spot buying is moderately heavier at $18.50 a ton, local furnaces. Shipments for the first week of August are a shade heavier than in the corresponding period of July, which may prove to be the low point of the summer. Two merchant furnaces remain in blast.

Reinforcing Bars

Government funds are again coming to the rescue of fabricators in the form of numerous post offices and filter plants. The filter project at Milwaukee, requiring about 4000 tons, is again coming to life. Cedar Rapids, Iowa, and Hoyne, Ind., have like projects under way. Road programs are by no means completed, but available tonnages are light for the reason that most contracts are for very short sections. Sellers of reinforcing bars in reviewing the first half of 1933 compared to the first six months of 1934, find the current year to be leading by at least 50 per cent on a tonnage basis.

Cast Iron Pipe

Awards generally are light, the outstanding exception being 1000 tons of pipe and fittings placed by Columbus, Ohio, with James B. Clow & Sons. Chicago's tonnage is not yet placed, though only red tape holds up the affixing of signatures. Private work is still lacking, but considerable tonnage is in prospect from new PWA jobs. A number of small Mid-western towns have had plans prepared for filter plants and Milwaukee is again reviving its water plant project.

Sheets

Demand for shipments is spotty and, on the whole, is running about even with the average for recent weeks. Automobile builders are still in the market, but their requirements are diminishing. Cabinet makers' operations are lagging, and demand for roofing is at low ebb as a result of seasonal influences. Barrel and container manufacturers, though now operating at a low rate, are encouraged as to the long-range view, and mills believe some sizable tonnages are in the making.

Cold-Rolled Strips

New orders from automobile manufacturers and parts makers are largely fill-in in character. Stocks in their hands are large and their operations are gradually declining. A bulge in new business is expected in the early fall when new models are started through shops.

Wire Products

Producers are holding to current price schedules and there is no disposition to change them at this time. Output is varying from day to day, but the range of its swing is confined within the limits of from 30 to 35 per cent of capacity. On the whole, this market is marking time, though in some directions, notably the East and Southeast, there is moderate increase in demand. Limited rains have fallen in the West but the precipitation has been insufficient to save crops. Reports from the Rocky Mountain region are to the effect that another heat wave is starting across the Prairie States.

Rails and Track Supplies

Expected rail purchases have not materialized and mills are on the home stretch so far as operating schedules are concerned. Without new business rail mills will close down before the end of this month.

Bars

There is little change in this market beyond the fact that automobile manufacturers and parts makers are slowly but certainly curtailing output and therefore are taking less steel from Chicago mills. The agricultural implement industry is marking time, not knowing at this time what the future holds for it.

Plates

Short pipe lines to be laid in Montana and Idaho are contributing some plate tonnage to the local market. Encouragement is also to be derived from an inquiry for 2500 tons of tank plates for a project in the Southwest. Plans are out for the Mississippi River dam at Trempealeau, Wis., for which some plate tonnage will be needed. Railroad shops are drawing on mills for very limited tonnages.

Structural Material

New awards are limited to 1300 tons and fresh inquiries are still more skimpy. Fabricators report that lists being estimated are the smallest of the year, but believe this condition will soon improve because of Government money that is to be spent this fall. However, these Government plans do not offer much for the immediate Chicago district. Plans are now out for one of the Mississippi River dams, and plans for the second unit should be ready about the middle of the month. Bids are to be opened about mid-September. The work of fabricating the overhead crossing to be erected at Niles Center, Ill., is finally under way.

Coke

July prices are being carried forward for delivery in August. These are $9.25 a ton, for delivery in Chicago and $8.50, ovens, for delivery outside of Chicago. Shipments are showing a slight tendency to increase in volume.

Scrap

Two attractive mill purchases of heavy melting steel have brought prices of $9.25 and $9.50 a gross ton, delivered. This situation developed rapidly and jolted those dealers who believed prices had reached bottom. The desire of yard operators to move tonnage, combined with receding mill operations, are strong influences in the downward movement of the price structure. Railroads were also caught in the swing, and before the week was out accepted as low as $9.75 delivered, for the heavy melting grades.

Tin Plate Demand Is Only Feature in New York Mart

Can Companies Get Rush Orders as a Result of Enforced Slaughter of Western Cattle — Export Tin Plate Price Up

NEW YORK, Aug. 7.—Demand for finished steel has undergone a further decline. Except for a fair volume of business in tin plate for both domestic and export account, the market is extraordinarily quiet. Buyers who had expected to be back in the market by this time to replenish stocks now find that their supplies will last them well into September. Others will have no need for further material until October.

No additional structural steel inquiries or awards have been reported in this district. Bookings in stainless and alloy steels continue to hold up somewhat better than business in most carbon steels. U.S.S. Corten high-tensile steel will be used for the construction of 21 suburban and 10 de luxe streamlined passenger coaches just placed with the Pullman-Bradley Car Corpn., Worcester, Mass, by the Boston & Maine.

Can companies are receiving large rush orders for cans as a result of the wholesale slaughter of Western cattle. An upturn in tin plate specifications has followed.

Tin plate for export has advanced again to $4.12 a box, Pittsburgh. This latest rise brings the American export price at seaboard to virtual parity with the Welsh price which was recently boosted to 18s., Swansea. The rising trend of tin plate prices has stimulated considerable anticipatory covering in the export market, and, as still higher prices are in prospect, further building up of user inventories is looked for. As a result of an agreement reached by the international tin plate pool, tin plate prices will be quoted c.i.f. ports of destination beginning with the fourth quarter. This means that American producers in competing for foreign business will have to meet prices as they find them, with the result that the amount that they net at the mill will vary considerably.

Export business in most forms of finished steel has been well maintained. In the first six months of this year foreign bookings of several American companies were twice as large as their totals for the last half of 1933.

Pig Iron

Most foundries in this territory are looking forward to the fourth quarter with considerable optimism, but currently they are not interested in purchasing fresh supplies. Yard stocks are sufficient in most cases for continued operation at the present rate through September, and even at that time there will probably not be much contracting ahead, as the code regulation prohibiting a price advance has eliminated the incentive for contracting for heavy tonnages. As regards prices, most furnace representatives are of the opinion that no change will be made for the fourth quarter. Sales last week totaled 1100 tons, as compared with 1000 tons in each of the two preceding weeks.

Reinforcing Steel

A fair amount of small tonnage is being placed, but aggregate bookings are still considerably under expectations. Rawlins Co., New York, was awarded 800 tons for the Prudential Insurance Co. apartment in Newark, N. J., and 350 tons for a building at Grasselli, N. J. The general contract for the Queens approach of the Triborough bridge has been let and 300 tons of bars should be placed within the next week. A considerable volume of mesh will come into the market during the next fortnight for State highway construction in Pennsylvania and New York.

Scrap

Foreign purchasers are again decidedly hesitant regarding new commitments. Practically no fresh business has been placed during the past week, but local buyers are still bidding $8 and $6.50 a ton for moderate amounts of No. 1 and No. 2 heavy melting steel on barge for shipment against orders already on their books. The uncertainty in the export market is attributed to a congestion of previous shipments at delivery ports, the difficulty in securing profitable rates for boats, and a general unwillingness to take positions beyond September in view of indefinite industrial prospects. However present foreign backlogs will carry local brokers beyond the middle of September, and before that time considerable fresh foreign business, as well as some domestic demand, is looked for by most of the trade. The domestic market is currently even more discouraging than last week. Only a little specialty tonnage is being moved, as almost all eastern Pennsylvania mills have temporarily held up shipments on the small tonnages of regular grades under contract. However, domestic demand in some volume should appear within the next month as mills start buying against early fourth quarter requirements.

Demand for Scrap for Export Off at Boston

BOSTON, Aug. 7. — The pig iron market here is quite flat, sales the past week not exceeding 300 tons. Certain furnace representatives are negotiating with melters on an aggregate of about 300 tons, but the business is for the future rather than the present.

A Swedish steamer has been chartered to load a round tonnage of scrap here for a United Kingdom port this week, and 5000 tons for Japan will also start loading. Buying for export, however, has practically ceased, shippers having covered their requirements. They paid around $7 a ton delivered for No. 2 steel and about $8 for No. 1. A fair tonnage of chemical borings for Long Island consumption has been shipped on old contracts, and a little breakable cast and No. 2 steel for New England consumption, but the domestic scrap market otherwise has gone rather stale.

An indefinite layoff of workers at the Boston & Albany railroad's West Springfield, Mass., locomotive shops, will, it is intimated, be followed by layoffs at other railroad shops, due to financial conditions.

Business at Low Level In Cincinnati

CINCINNATI, Aug. 7.—New business in pig iron is at a low ebb. Foundry operations are spasmodic, averaging about two heats a week.

Sheet bookings have declined to about 25 per cent of mill capacity. In keeping with this trend, rolling schedules for this week were revised downward. Automobile manufacturers are still accounting for the bulk of current business.

Warehouse business shrank in July, but remains on a higher level than a year ago.

New business in scrap is so small as to be almost nil, and mills are restricting shipments. Prices are steady, but nominal.

Output Up One Point in Philadelphia District

Rise to 22 Per Cent Due Entirely to Stocking by Purchasers—Iron and Steel Demand Still Marking Time

PHILADELPHIA, Aug. 7.—The market in this district continues to mark time and the trade does not look for any substantial pickup before next month. Owing to additional stocking of steel, however, open-hearth operations have been increased one point to 22 per cent of capacity.

Consumers are limiting purchases to actual requirements, which call for only small lots. It is believed that fair demand for such products as wire and hardware lines will see a seasonal improvement early in September. In the heavy lines the market is extremely dull with no early upswing in sight, inasmuch as railroad and construction requirements, such as they are, have been covered.

The only sizable tonnage in plates and shapes in sight will be for 24 naval vessels, including four cruisers, 16 destroyers and 6 submarines, one-half of which will be built in private and one-half in Navy yards. Bids for the vessels will be taken on Aug. 15 and private yards have asked estimates of steel makers.

Pig Iron

The market is dragging. Sales are confined to carlots and almost exclusively involve foundry grades.

Plates, Shapes and Bars

The past week has seen no change in these lines and the market remains dull. It is reported that the Seaboard Air Line soon will place orders for 100 70-ton phosphate cars, calling for 4625 tons of plates and 360 tons of structural steel. This carrier also has ordered five locomotives with the Baldwin Locomotive Works. While the Pennsylvania Railroad is said to be considering the building of 3000 hopper cars, the report has not been verified. Railroads appear to be increasingly cautious in coming into the market. The Navy Department will take bids Aug. 22 for a sheet metal shop at Norfolk, Va., calling for 3000 tons of structural material.

Sheets

Demand is dull and steel makers do not look for any marked improvement over the remainder of the present month except from radio makers, who are said to have prepared a fair-sized production program to go into effect soon. Automotive buying consists of only small lots to supplement existing stocks. Long terne sheets, unassorted, No. 24 gage, base, have been reduced $1 per ton to 3.40c. Pittsburgh, effective Aug. 4.

Warehouse Business

Jobbers report business dull. Prices remain unchanged.

Imports

The following iron and steel imports were received here last week: 4607 tons of pig iron from the Netherlands and 13 tons of steel rods from Sweden.

Scrap

The market has softened 50c. per ton in several grades, with a sale of 1000 tons of No. 2 heavy melting steel being made at $8.50. Other grades down are old hydraulic compressed sheets, heavy breakable cast and low phosphorus. Sales of knuckles and couplers and rolled steel wheels are reported to have been made at $14 during the past week, though the range remains at $13.50 to $14. Export demand remains good and is an important factor in bolstering the market.

Steel Rate Holds At Buffalo

BUFFALO, Aug. 7.—Foundry melt is holding up a little better than in recent previous weeks. Inquiries for pig iron are few, and involve at the most only about 200 tons.

Steel output remains substantially unchanged, with seven open-hearths active at Bethlehem's Lackawanna plant, three at the Republic Steel Corpn. and one at Wickwire-Spencer Corpn. The Seneca sheet division of Bethlehem is running at about 30 per cent.

Indications are not especially good for improved steel business. Automobile demand is conceded to be over for the time being, and the railroads have not come into the market to the extent expected.

A Buffalo creamery will require over 100 tons of reinforcing bars, and the new Kensington high school will require about 500 tons. An addition to a Buffalo department store, involving 125 tons of structural steel, went to a local fabricator. The East End brewery job in Utica, N. Y., will require 280 tons of structural steel.

The feature of the scrap market this past week was the purchase of 2000 tons of No. 2 heavy melting steel by a Buffalo mill at a reported price of $8.75. No No. 1 was involved in the purchase. Some inquiry has developed for short rails and a sale of No. 1 machinery cast for the Buffalo district was made at $10.75.

Steel Output Rises In South

BIRMINGHAM, Aug. 7.—With most consumers heavily stocked, there is little new business in iron and steel.

Blast furnace operations are unchanged, with seven stacks active. Five of these are being operated by merchant producers. It is reported that one or two may be banked within the next week or so.

Last week only two open-hearth units were worked. This week there will be six. The Tennessee Coal, Iron & Railroad Co., which did not operate any open-hearths during most of last week, started four at Fairfield on Saturday.

Within the next week or ten days, the Bessemer plant of the Pullman Car & Mfg. Corpn. will resume production after an idleness of more than three years. As previously reported, this company has orders for 200 hopper cars from the Central of Georgia and 700 box cars from the Seaboard Air Line.

Pipe plants expect a 20 per cent increase in shipments this month, as compared with July. Last month failed to measure up to June, but lately there has been an increase in releases of old PWA awards, some of which have been on the books for six months and longer. July provided an increase in the number of PWA bid openings, but about 25 per cent did not result in awards, as bids ran above the allotments, and most of the others are subject to later releases. Scheduled bid openings this month will not be as numerous.

ZEH & HAHNEMANN CO., Newark, N. J., announces the appointment of L. Heres de Wyk & Son, Derby, Conn., as exclusive agents for the state of Connecticut.

Orders Confined to Small Lots at Cleveland

Inventories Will Last Consumers Through August — Steel Ingot Output Rises Slightly to 24 Per Cent of Capacity

CLEVELAND, Aug. 7.—The first week of August has brought little change to the steel industry in this district. Orders are still confined to very small lots and consumers are showing little interest in forward requirements. Manufacturers in the territory have reduced their schedules to low levels and inventories accumulated during June seem likely to supply August needs.

Steel ingot production in the Cleveland-Lorain territory has increased slightly to 24 per cent of capacity. This is due to the fact that an open-hearth plant which ran only half of last week is operating six days in the current period. The number of furnaces active has not changed.

With substantial orders from the automobile industry apparently delayed until after Labor Day, there is now little likelihood of much improvement in steel operations until September. Building operations are light and structural steel awards are lacking. Several small inquiries for sheet steel piling have appeared, but the aggregate tonnage involved is not large.

Pig Iron

Shipments thus far in August show little change from the July rate, which was exceedingly low. Sales are confined to small lots and consumers are showing no interest in their forward requirements. The foundry melt in this territory reflects seasonal curtailment, although makers of castings for the railroads are still fairly busy.

Iron Ore

July shipments from Lake Superior ports totaled 4,432,140 tons, compared with 4,460,807 tons in the previous month and with 3,429,683 tons in July, 1933. The gain over July of last year was 1,002,457 tons, or nearly 30 per cent. The movement up to Aug. 1 this season totaled 11,523,525 tons, a gain of 5,828,829 tons or 102 per cent over the 5,694,696 tons brought down prior to Aug. 1, 1933.

Bolts, Nuts and Rivets

Some makers report a slight improvement in inquiry, but the market generally is very dull. No pressure is being exerted against prices and the market is considered very firm.

Sheets

In the absence of demand from the automobile industry, the sheet market continues very dull. Barrel makers are still well supplied with stock and most of them have no intention of entering the market this month. Miscellaneous manufacturing demand is at a low ebb and, with industrial activity in the usual summer slump, stocks are not being reduced very rapidly. Prices on the common finishes of sheets seem to be stabilized, and sellers are anxious to rebuild the confidence of consumers.

Strip Steel

No improvement in demand is reported, but mills believe that August business will show considerable improvement over July. Automotive parts makers are reducing their schedules this month, but their stocks are being cut down and some information is offered that they will come into the market before Labor Day. A sizable tonnage of strip is being taken for highway road guards. Cooperage stock is unusually quiet.

Bars, Plates and Shapes

In the absence of large structural steel and reinforcing bar awards, the market for heavy hot-rolled products is very dull. The Y.M.C.A. in Toledo, requiring 800 tons of shapes, is still pending, but no other sizable projects are before the trade. A few small sheet steel piling jobs are coming out in the next month, principally for harbor improvement along Lake Erie. Demand for plates is very quiet, with the boiler and shipbuilding industries both inactive.

Scrap

The market is weaker, but no sales of heavy melting steel or hydraulic bundles have been made which might justify lower quotations. Mills are showing no interest in purchases and quite a little distress material is appearing in the absence of definite shipping points. Machine shop turnings and short shoveling steel turnings have declined 50c. a ton and the blast furnace grades are weaker.

Brazil Favorable Market For Iron and Steel

BRAZIL affords a favorable market for imported iron and steel products, according to Commercial Attache R. H. Ackerman, Rio de Janeiro, in a report to the Commerce Department.

Domestic production, he points out, has increased with the insistent demand for those products which lend themselves to economical production within the country, but with the expansion in manufacturing, housing, transportation and corresponding improvement in the general living standards, local production has not kept pace with the increasing requirements. The increased local output, the report states, has not had the effect of curtailing imports.

Owing to climatic conditions and low purchasing power of a large part of the population, the per capita use of iron and steel in Brazil is still relatively small. Notwithstanding, the types of iron and steel products entering into commerce in Brazil are as broad as in any highly industrial country, ranging from manufactures for reworking purposes to specialized manufactures of high carbon steel and alloys. In general, it may be said that Brazil has a limited production of iron and steel products which require simple processing, whereas it relies on importations of manufactures requiring a greater element of technical skill or heavy capital investment.

Imports in 1933, covering 25 of the principal classifications, amounted to 240,381 metric tons, an increase of more than 50 per cent over the preceding year. Domestic production in 1933 reached higher levels than ever before attained. During the first three months of the current year Commercial Attache Ackerman states inquiries were numerous for all classes of structural steel, tin plate and tubes, while construction activity continued at a high level with the market seemingly healthy.

Railroad Equipment

Boston & Maine has ordered 21 streamlined suburban coaches and 10 deluxe streamlined passenger coaches from Pullman-Bradley Corpn., Worcester, Mass. The cars are to be built of Corten high-tensile steel.

Seaboard Air Line has ordered five locomotives from Baldwin Locomotive Works.

July Steel Ingot Production 51.2 Per Cent Under Previous Month's Total

JULY production of Bessemer and open-hearth ingots, as reported by the American Iron and Steel Institute, amounted to 1,472,584 gross tons, a decrease of 51.2 per cent from the 3,015,972 tons produced in June. In July, 1933, production was 3,168,354 tons. Steel was made last month at the rate of 58,903 tons daily, or at 26.75 per cent of capacity, which stood at 68,478,813 gross tons on Dec. 31, 1933, as compared with 67,386,130 tons one year before. June operations were at 52.68 per cent of capacity.

Ingot output in the first seven months of the year amounted to 17,653,473 tons, as compared with 12,042,742 tons in the corresponding 1933 period.

MONTHLY PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

Reported for 1933 by Companies Which Made 97.82 Per Cent of 1933 Ingot Output

1933	Open-Hearth	Bessemer	Calculated Output All Companies Monthly	Calculated Output All Companies Daily	No. of Working Days	Per Cent Operation‡
January	885,663*	109,000	1,016,870†	39,110†	26	17.99†
February	922,798*	126,781	1,073,012†	44,709†	24	20.57†
March	784,111*	94,509	898,236†	33,268†	27	15.30†
April	1,180,823*	135,217	1,345,422†	53,817†	25	24.76†
May	1,716,425*	216,841	1,976,428†	73,201†	27	33.68†
June	2,211,652*	296,765	2,564,420†	98,632†	26	45.37†
July	2,743,326*	355,836	3,168,354†	126,734†	25	58.30†
Seven Months	10,444,798	1,334,949	12,042,742	66,904	180	30.78
August	2,430,663*	370,370	2,863,569†	106,058†	27	48.79†
September	1,991,204*	242,014	2,283,079†	87,811†	26	40.40†
October	1,847,690*	191,673	2,084,894†	80,188†	26	36.89†
November	1,331,029*	156,939	1,521,189†	58,507†	26	26.92†
December	1,629,495*	129,834*	1,798,606†	71,944†	25	33.10†
Total	19,674,879*	2,425,779*	22,594,079†	72,884†	310	33.53†

* Revised. † Adjusted.

‡ The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1932, of 67,386,130 gross tons for open-hearth and Bessemer steel ingots.

Reported for 1934 by Companies Which Made 99.39 Per Cent of Ingot Production in 1933

1934						
January	1,786,467	172,489	1,970,979*	72,999*	27	33.15*
February	1,993,638	175,873	2,182,826*	90,951*	24	41.31*
March	2,540,143	203,904	2,760,888*	102,255*	27	46.44*
April	2,622,372	257,482	2,897,529*	115,901*	25	52.64*
May	3,000,624	331,620	3,352,695*	124,174*	27	56.39*
June	2,714,983	282,592	3,015,972	116,999	26	52.68
July	1,343,732	119,869	1,472,584	58,903	25	26.75
Seven Months	16,001,959	1,543,829	17,653,473	97,533	181	44.30

* Revised.

‡ The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1933, of 68,478,813 gross tons for open-hearth and Bessemer steel ingots.

Automobile Workers Secede in Large Groups

(Concluded from Page 48)

stoutly defended Mr. Byrd. In fact, Mr. Greer is understood to be the spokesman for Mr. Byrd in local labor circles. Paradoxically Mr. Greer defends Mr. Byrd, who has supported the conciliatory policy of Dr. Leo Wolman on the Automobile Labor Board, yet is critical of the American Federation of Labor for its program of inaction. He says that "in the San Francisco strike the American Federation of Labor did not declare itself until it found out that the public was against the strike. Then it too came out against the strike. The Federation is afraid to take any direct action. It's always playing politics and it's against strikes anyway because it has to pay striking workers benefits out of union dues."

The dissenters charge that 35c. out of every dollar of their dues goes to the Federation and is spent without their having a voice. Mr. Collins minimizes the present difficulties, asserting that the secession at the Hudson and Oldsmobile unions occurred without authority of the members of those chapters and that the matter will be straightened out shortly.

More Sheet Metal In Future Buildings

THE future building will tend more and more to be constructed almost entirely of steel and glass with an insulating material which will have a good value in re-use. Such is the view of Francis Lorne, fellow of the Royal Institute of British Architects, expressed in a paper read before the recent international congress for steel development held in London, England.

The nonsense of building for hundreds of years, he said, must be exploded. It is essential today, he asserted, that our buildings be assembled with a view to change, not only internally but externally as well. "We are entering an age when the great proportion of our buildings will have a much shorter lifetime than they have had formerly. The conditions of our life are changing so rapidly that it is difficult for us to build beyond our own generation and more difficult every day for us to dream what our children will require. . . . These buildings of the future with steel frame, with walls, partitions and floors of light sheet metal, efficiently insulated, with surfaces, exterior and interior treated with color, the rooms supplied with conditioned air, which means washed, warmed or cooled fresh air, will provide the future man with an entire control of living conditions over the inclemency of the elements and with a far greater flexibility for his ever-changing form of life. They will be all the more suitable for his purpose because they will be built by himself for himself, not for his heirs and successors."

He charged architects with the almost unfailing tendency to clothe the steel frame of the modern structure "with stone and brick traditional forms which belong to the older but fast disappearing wall-bearing structure, with the result that we have in most countries buildings which are technically modern but artistically heavily monumental, traditional and out of date."

Art expression, he contended, never precedes but follows technical achievement. The time lag in finding a new art expression for a new technique in any people can be measured by the quickness or slowness of their reactions to new forms.

All that is really necessary in a wall, he pointed out, is that it shall be open enough to admit as much light as the room demands and strong enough to keep out the elements and prevent anyone pushing furniture into the street. "As far as we can see at the moment some form of sheet metal product will satisfy these requirements best."

He ridiculed the present tendency to dress up the sheet metal stairway of the modern steel frame structures with stone, marble, terrazzo, etc., to make it look like the "stone stair of a dead period." It makes it appear something which it is not and loads the structure unnecessarily. He termed abortive the method of making metal doors imitate wood with heavily molded architraves and applied moldings, when they might well have plain frames with the door flush and painted in distinguishing colors. Similarly, partitions should be treated along lines mentioned for doors, with cork or other insulating core to prevent sounds traveling from room to room. He suggested that sheet metal furniture is eminently satisfactory, especially when wood forms are not copied, and he referred to the development of the combined stove and refrigerator, where the insulation between the two parts has been so perfected that it points to a similar treatment of external walls and internal partitions.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel — *Base per Lb.*

F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Duluth	1.95c.
Del'd Detroit	1.95c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
Del'd Philadelphia	2.09c.
Del'd New York	2.13c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.25c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Reading, Pa.	
F.o.b. Danville, Pa.	
F.o.b. Berwick, Pa.	

Cold Finished Bars and Shafting*

Base per Lb.

F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan	2.35c.

* In quantities of 10,000 to 19,999 lb.

Fence and Sign Posts

Angle Line Posts

Base per Net Ton

F.o.b. Pittsburgh	$50.00
F.o.b. Chicago	50.00
F.o.b. Duluth	51.00
F.o.b. Cleveland	50.00
F.o.b. Birmingham	53.00
F.o.b. Houston	53.00
F.o.b. cars dock Pacific ports	67.00

Plates

Base per Lb.

F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.95c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.95c.
Del'd New York	2.08c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.25c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Floor Plates

F.o.b. Pittsburgh	3.25c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.35c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.85c.
F.o.b. Buffalo	1.985c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.005c.
Del'd New York	2.0525c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

Base per Lb.

No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.14c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. dock cars Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. dock cars Pacific ports	3.00c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.55c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.39c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast ports	3.25c.

Tin Plate *Base per Box*

Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

Base per Lb.

All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Comerage stock, Pittsburgh	2.10c.
Comerage stock, Chicago	2.20c.

Cold-Rolled Strips

Base per Lb.

F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.88c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 16 and heavier, Pittsburgh or Cleveland	3.15c.
F.o.b. Worcester	3.55c.
No. 17 and lighter, Pittsburgh or Cleveland	3.36c.
F.o.b. Worcester	3.70c.

Hot-Rolled Rail Steel Strips

Base per Lb.

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade Per Lb.

Bright wire	2.30c.
Spring wire	3.20c.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

Base per Keg

Standard wire nails	$2.60
Smooth coated nails	2.60
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10

Base per 100 Lb.

Annealed fence wire	$2.45
Galvanized fence wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On manufacturers' wire prices at Pacific ports are $5 above the Pittsburgh base. On high-carbon spring wire, prices at Pacific ports are also $5 above Pittsburgh. On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi are $6 a ton over Pittsburgh, while New Orleans and Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are $11 a ton above Pittsburgh.

Wire Hoops, Twisted or Welded

Off List

F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

Bale Ties, Single Loop

Base per Net Ton

F.o.b. Pittsburgh	$63.00
F.o.b. Chicago	61.00
F.o.b. Duluth	65.00
F.o.b. Cleveland	63.00
F.o.b. Birmingham	66.00
F.o.b. cars dock Houston, Galveston, Beaumont, Orange or Corpus Christi, Tex.	72.00
F.o.b. cars dock Pacific ports	74.00

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			Wrought Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	51½	29½	⅛	+9	1½ +138
¼ to ⅜	53½	35	¼ & ⅜	+1½	+21½
½	58½	47	½	+3	1½ 15
¾	62	52	¾	+3	6½ 20½
1 to 2	64	55	1 & 1¼	39½	25½
			1½	42½	28
			2	41½	26

Lap Weld

2	60	51	2	37	22½
2½ to 3	63	54	2½ to 3½	38	25
3½ to 6	65	56	4 to 8	40	28½
7 and 8	64	54	9 to 12	38	24½
9 and 10	63½	53½			
11 and 12	62½	52½			

Butt Weld, extra strong, plain ends

⅛	48½	33½	⅛	+13	+45½
¼ to ⅜	51	38	¼ & ⅜	+2½	+31½
½	56½	47½	½	+3	2½ 17½
¾	61	52	¾	+3	7½ 22½
1 to 3	63	55	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2½ to 3	62	54	2½ to 4	45½	33
3½ to 6	65½	57½	4½ to 6	45	33½
7 and 8	64½	54½	7 & 8	46	33
9 and 10	63½	53½	9 to 12	41½	30
11 and 12	62½	52½			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base. On structural steel pipe the base is reduced 2 points and two 5's are allowed to consumers and three off to jobbers.

Note—Chicago district mills have a base two points less than the above. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

			Cold Drawn	Hot Rolled
1 in. o.d.	13	B.W.G.	$ 8.60	
1¼ in. o.d.	13	B.W.G.	10.19	
1½ in. o.d.	13	B.W.G.	11.26	
1¾ in. o.d.	13	B.W.G.	12.81	
2 in. o.d.	13	B.W.G.	14.35	$13.04
2¼ in. o.d.	13	B.W.G.	16.90	14.54
2½ in. o.d.	12	B.W.G.	19.20	17.54
2¾ in. o.d.	12	B.W.G.	20.45	18.59
3 in. o.d.	12	B.W.G.	21.45	19.58
3¼ in. o.d.	11	B.W.G.	25.22	22.93
3½ in. o.d.	11	B.W.G.	27.00	24.62
4 in. o.d.	10	B.W.G.	33.60	30.54
4½ in. o.d.	10	B.W.G.	41.08	37.35
5 in. o.d.	9	B.W.G.	51.56	46.87
6 in. o.d.	7	B.W.G.	79.15	71.96

Extras for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
10,000 lb. or ft. to 24,999 lb. or ft.	12½ %
2,000 lb. or ft. to 9,999 lb. or ft.	25 %
Under 2,000 lb. or ft.	40 %

Hot-Finished Lapweld Steel Pressure Tubes

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

1½ in. o.d.	13	B.W.G.	$ 9.72
1¾ in. o.d.	13	B.W.G.	11.06
2 in. o.d.	13	B.W.G.	12.38
2¼ in. o.d.	13	B.W.G.	15.79
2½ in. o.d.	12	B.W.G.	16.58
2¾ in. o.d.	12	B.W.G.	17.54
3 in. o.d.	12	B.W.G.	18.35
3¼ in. o.d.	11	B.W.G.	21.56
3½ in. o.d.	11	B.W.G.	23.15
4 in. o.d.	10	B.W.G.	28.66
4½ in. o.d.	10	B.W.G.	35.22
5 in. o.d.	9	B.W.G.	41.25
6 in. o.d.	7	B.W.G.	68.14

Quantity Extras:

40,000 lb. or ft.	base
25,000 lb. or ft. to 39,999 lb. or ft.	plus 5 %
10,000 lb. or ft. to 24,999 lb. or ft.	plus 12½ %
2,000 lb. or ft. to 9,999 lb. or ft.	plus 25 %
Under 2,000 lb. or ft.	plus 40 %

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$47.00
4-in., del'd Chicago	50.00
6-in. and larger, del'd New York	45.00
4-in. del'd New York	48.00
6-in., and larger, Birmingham	39.00
4-in. Birmingham	42.00

Class "A" and gas pipe, $3 extra.

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton	$56.37½
Angle bars, per 100 lb.	2.35

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$37.00
Light rails (from rail steel) per gross ton	31.00

Base per 100 Lb.

Spikes, 9/16 in. and larger	$2.40
Spikes, ½ in. and smaller	2.40
Spikes, boat and barge	2.10
Tie plates, steel	1.90
Track bolts, to steam railroads	3.55
Track bolts, to jobbers, all sizes (per 100 count)	70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va., Jersey City, N. J.

Girder Rails

Per Gross Ton

F.o.b. Lorain	$47.00
F.o.b. Steelton	47.00

Splice Bars for Girder Rails

Base per 100 Lb.

F.o.b. Lorain and Steelton	$4.30

Steel Car Axles

Base per Lb.

F.o.b. Pittsburgh	2.65c.
F.o.b. Chicago	2.65c.
F.o.b. Birmingham	2.65c.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

...burgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

... 70
... 70
... 70
...in. 1, 2, 3 and 7 heads.. 70
...nuts, blank or tapped, ... 70
...nuts, blank or tapped, ... 70
...square or hex. nuts, blank ... 70
... 70
...hexagon nuts ... 70
...hexagon castellated nuts, ... 70
...in packages, Pittsburgh.. 75
...in packages, Chicago.... 75
...in packages, Cleveland.... 75
...in bulk, Pgh.... 83
...in bulk, Chicago.... 83
...in bulk, Cleveland.... 83
... 60

Large Rivets

...(½-in. and larger)

Base per 100 Lb.

...burgh or Cleveland....$2.90
... 3.00
...ingham ... 3.05

Small Rivets

...(½-in. and smaller)

Per Cent Off List

...burgh ...70 and 5
... ...70 and 5
...ago and Birm'g'm....70 and 5

Cap and Set Screws

...ered up to but not exceeding ...on lots of 200 lb. or more)

Per Cent Off List

...screws, 1 in. dia. and ...75, 10 and 10
...headed set screws, case hardened, ...in. dia. and smaller..75 and 10
...set screws, cut thread ...and smaller ... 75
...head cap screws, U.S.S.S. thread, 1 in. dia. and ... 85
...screws, cut and oval point ... 75 and 10
... 65

Alloy and Stainless Steel

Alloy Steel Ingots

...Pittsburgh, Chicago, Canton, Buffalo, Bethlehem. ...$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

...Pittsburgh, Chicago, Canton, Buffalo, Bethlehem. ...$49 a gross ton. ...Del'd Detroit is $52.

Alloy Steel Bars

...Pittsburgh, Chicago, Buffalo, Massillon or Canton. ...grade, base.....2.45c. ...price at Detroit is.....2.60c.

	Alloy Differential per 100 lb.
...Nickel)	$0.25
...Nickel)	0.55
...Nickel)	1.50
...Nickel)	2.25
...Nickel Chromium	0.55
...Nickel Chromium	1.35
...Nickel Chromium	3.80
...Nickel Chromium	3.20
...Molybdenum (0.15 ...0.25 Molybdenum)	0.50
...Molybdenum (0.25 ...0.40 Molybdenum)	0.70
...Nickel Molybdenum (0.20 to ...Molybdenum) (1.50 to ...Nickel)	1.05
...Chromium Steel (0.60 to ...Chromium)	0.35
...Chromium Steel (0.80 to ...Chromium)	0.45
...Spring Steel....	base
...Vanadium Bar...	1.20
...Vanadium Spring ...	0.95
...Nickel Vanadium	1.50
...Vanadium ...	0.95

...prices are for hot-rolled steel ...The differential for most grades in ...furnace steel is 50c. higher. The ...rial for cold-drawn bars is ¼c. per ...der with separate extras. Blooms, ...slabs under 4x4 in. or equivalent sold on the bar base. Slabs with ...area of 16 in. and 2½ in. thick ...take the billet base. Sections 4x4 ...10x10 in. or equivalent carry a ...ential, which is the net price for ...the same analysis. Larger sizes ...extras.

Alloy Cold-Finished Bars

...Pittsburgh, Chicago, Gary, ...or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

...19% Cr, 7 to 9% Ni, 0.08 to 0.20% C)

...Base Prices, f.o.b. Pittsburgh)

	Per Lb.
...	23c.
...	26c.
...	32c.
...rolled strip ...	20½c.
...rolled strip ...	27c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Uncropped .....$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham. Uncropped .....$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham

Per Gross Ton

Rerolling $27.00
Forging quality 32.00

Delivered Detroit

Rerolling $30.00
Forging 35.00

Billets Only F.o.b. Duluth

Rerolling $29.00
Forging 34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer.....$28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved .....1.70c.
Universal .....1.70c.
Sheared .....1.70c.

Tube Rounds

Base per Lb.

F.o.b. Pittsburgh .....1.80c.
F.o.b. Chicago .....1.85c.
F.o.b. Cleveland .....1.85c.
F.o.b. Buffalo .....1.90c.
F.o.b. Birmingham .....1.95c.

Wire Rods

(Common soft, base)

Per Gross Ton

F.o.b. Pittsburgh $38.00
F.o.b. Cleveland 38.00
F.o.b. Chicago 39.00
F.o.b. Anderson, Ind. 39.00
F.o.b. Youngstown 39.00
F.o.b. Worcester, Mass. 40.00
F.o.b. Birmingham 41.00
F.o.b. San Francisco 47.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$19.50	$20.00	$19.00	$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	....	....	19.00	....
Sparrows Point, Md.	19.50	....	19.00	....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	17.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	....
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	....
Duluth, Minn.	19.00	19.00	....	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	....	17.00	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District From Everett, Mass.	$20.00	$20.50	$19.50	$21.00
Brooklyn From East Pa. or Buffalo...	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J. From East. Pa. or Buffalo...	20.89	21.39	20.39	21.89
Philadelphia From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati From Hamilton, Ohio	19.51	19.51	19.01	20.01
Canton, Ohio From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio From Hamilton, Ohio.....	20.50	20.50	....	....
Mansfield, Ohio From Cleveland and Toledo...	20.26	20.26	....	....
Indianapolis From Hamilton, Ohio.....	20.77	20.77	....	....
South Bend, Ind. From Chicago	20.55	20.55	....	....
Milwaukee From Chicago	19.50	19.50	....	....
St. Paul From Duluth	20.94	....	....	....
Davenport, Iowa From Chicago	20.26	20.26	....	....
Kansas City From Granite City	21.04	21.04	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.....$23.50
Johnson City, Tenn. 19.56
Del'd Chicago 25.15

GRAY FORGE PIG IRON

Valley furnace $18.25

CHARCOAL PIG IRON

Lake Superior furnace $21.00
Delivered Chicago 24.04
Delivered Buffalo 24.28

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75.....$21.00
No. 2 fdy., sil. 1.75 to 2.25..... 20.50
Malleable 21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75.....$22.50
No. 2 fdy., sil. 1.75 to 2.25..... 22.00
Malleable 22.50
Basic 22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $85.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% $26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads) $77.50
50% (ton lots) 85.00
75% (carloads) 126.00
75% (ton lots) 136.00
14% to 16% (f.o.b. Welland, Ont. (in carloads) (duty paid).. 31.00
14% to 16% (less carloads) 38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$22.75	12%	$29.25
7%	23.75	13%	30.75
8%	24.75	14%	32.25
9%	25.75	15%	33.75
10%	26.75	16%	35.25
11%	27.75	17%	36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$27.75	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads .....$1.40 to $1.50
Ferrotungsten, less carloads 1.55 to 1.60
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr, per lb. contained Cr, delivered, in carloads ..... 10.00c.
Ferrochromium, 2% carbon .....16.50c. to 17.00c.
Ferrochromium, 1% carbon .....17.50c. to 18.00c.
Ferrochromium, 0.10% carbon .....19.50c. to 20.00c.
Ferrochromium, 0.06% carbon .....20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V.....$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton $137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage..... 50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage..... 65.00
Ferromolybdenum, per lb. Mo., del. 95c.
Calcium molybdate, per lb. Mo., del. ..... 80c.
Silico spiegel, per ton, f.o.b. furnace, car lots $38.00
Ton lots or less, per ton 45.50
Silico-manganese, gross ton, delivered:
2.50% carbon grade 90.00
2% carbon grade 95.00
1% carbon grade 105.00
Spot prices .....$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.50 to $12.00
No. 2 heavy melting steel	10.50 to 11.00
No. 2 railroad wrought	11.50 to 12.00
Scrap rails	11.50 to 12.00
Rails 3 ft. and under	14.50 to 15.00
Compressed sheet steel	11.00 to 11.50
Hand bundled sheet steel	10.00 to 10.50
Hvy. steel axle turnings	11.00 to 11.50
Machine shop turnings	7.50 to 8.00
Short shov. turnings	7.50 to 8.00
Short mixed borings and turnings	7.00 to 7.50
Cast iron borings	7.00 to 7.50
Cast iron carwheels	11.50 to 12.00
Heavy breakable cast	10.00 to 10.50
No. 1 cast	12.00 to 12.50
Railr. knuckles and couplers	13.25 to 13.75
Rail. coil and leaf springs	13.25 to 13.75
Rolled steel wheels	13.25 to 13.75
Low phos. billet crops	15.00 to 15.50
Low phos. sheet bar crops	14.00 to 14.50
Low phos. plate scrap	13.50 to 14.00
Low phos. punchings	14.00 to 14.50
Steel car axles	14.50 to 15.00

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton

Heavy melting steel	$8.00 to $8.50
Automobile hvy. melt. steel	8.50 to 9.00
Shoveling steel	7.00 to 7.50
Hydraulic comp. sheets	8.00 to 8.50
Drop forge flashings	7.00 to 7.50
No. 1 busheling	7.00 to 7.50
Rolled carwheels	10.00 to 10.50
Railroad tires	10.00 to 10.50
Railroad leaf springs	10.00 to 10.50
Axle turnings	8.00 to 8.50
Steel couplers and knuckles	10.00 to 10.50
Coil springs	10.50 to 11.00
Axle turnings (elec. fur.)	8.50 to 9.00
Low phos. punchings	10.00 to 10.50
Low phos. plates, 12 in. and under	10.50 to 11.00
Cast iron borings	5.00 to 5.50
Short shoveling turnings	5.00 to 5.50
Machine shop turnings	4.75 to 5.25
Rerolling rails	10.00 to 10.50
Steel rails, less than 3 ft.	10.00 to 10.50
Steel rails, less than 2 ft.	10.50 to 11.00
Angle bars, steel	10.00 to 10.50
Cast iron carwheels	9.50 to 10.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	7.75 to 8.25

Per Net Ton

Iron car axles	$12.00 to 12.50
Steel car axles	10.25 to 10.75
No. 1 railroad wrought	7.50 to 8.00
No. 2 railroad wrought	8.00 to 8.50
No. 2 busheling	3.50 to 4.00
Locomotive tires, smooth	9.00 to 9.50
Pipe and flues	4.50 to 5.00
No. 1 machinery cast	8.00 to 8.50
Clean automobile cast	8.00 to 8.50
No. 1 railroad cast	7.50 to 8.00
No. 1 agricultural cast	7.00 to 7.50
Stove plate	5.25 to 5.75
Grate bars	4.75 to 5.25
Brake shoes	6.00 to 6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$10.00
No. 2 heavy melting steel	9.50
No. 1 railroad wrought	$11.00 to 11.50
Bundled sheets	9.50
Hydraulic compressed, new	10.00
Hydraulic compressed, old	6.50 to 7.00
Machine shop turnings	6.00
Heavy axle turnings	9.00 to 9.50
Cast borings	5.50 to 6.00
Heavy breakable cast	10.00 to 10.50
Stove plate (steel works)	8.00 to 8.50
No. 1 low phos. heavy	11.00 to 11.50
Couplers and knuckles	12.50 to 13.00
Rolled steel wheels	12.50 to 13.00
No. 1 blast furnace	5.50 to 6.00
Spec. iron and steel pipe	8.00
Shafting	15.00 to 16.00
Steel axles	14.50
No. 1 forge fire	9.50
Cast iron car wheels	11.00 to 11.50
No. 1 cast	11.50 to 12.00
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$7.25 to $7.75
Scrap rails for melting	8.25 to 8.75
Loose sheet clippings	3.75 to 4.25
Bundled sheets	5.75 to 6.25
Cast iron borings	5.00 to 5.50
Machine shop turnings	4.75 to 5.25
No. 1 busheling	6.25 to 6.75
No. 2 busheling	2.75 to 3.25
Rails for rolling	8.75 to 9.25
No. 1 locomotive tires	8.50 to 9.00
Short rails	11.25 to 11.75
Cast iron carwheels	7.75 to 8.25
No. 1 machinery cast	9.00 to 9.50
No. 1 railroad cast	8.50 to 9.00
Burnt cast	6.00 to 6.50
Stove plate	6.00 to 6.50
Agricultural malleable	8.00 to 8.50
Railroad malleable	8.00 to 8.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.00 to $9.50
No. 2 heavy melting steel	8.50 to 9.00
Compressed sheet steel	8.50 to 9.00
Light bundled sheet stampings	7.25 to 7.50
Drop forge flashings	8.00 to 8.50
Machine shop turnings	6.50 to 7.00
Short shoveling turnings	7.00 to 7.50
No. 1 busheling	8.00 to 8.50
Steel axle turnings	7.50 to 8.00
Low phos. billet crops	13.25 to 13.75
Cast iron borings	6.75 to 7.25
Mixed borings and short turnings	6.75 to 7.25
No. 2 busheling	6.75 to 7.25
No. 1 cast	11.50 to 11.75
Railroad grate bars	7.00 to 7.50
Stove plate	6.50 to 7.00
Rails under 3 ft.	14.00 to 14.50
Rails for rolling	15.50 to 18.00
Railroad malleable	11.50 to 12.00
Cast iron carwheels	10.75 to 11.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting steel	8.50 to 9.00
Scrap rails	9.50 to 10.00
New hydraul. comp. sheets	8.50 to 9.00
Old hydraul. comp. sheets	7.50 to 8.00
Drop forge flashings	7.50 to 8.00
No. 1 busheling	8.50 to 9.00
Hvy. steel axle turnings	6.50 to 7.00
Machine shop turnings	5.00 to 5.50
Knuckles and couplers	11.00 to 11.50
Coil and leaf springs	11.00 to 11.50
Rolled steel wheels	11.00 to 11.50
Low phos. billet crops	11.50 to 12.00
Short shov. steel turnings	7.50 to 8.00
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
No. 2 busheling	7.50 to 8.00
Steel car axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 machinery cast	10.00 to 10.50
No. 1 cupola cast	8.00 to 8.50
Stove plate	8.50 to 8.75
Steel rails, 3 ft. and under	12.00 to 12.50
Cast iron carwheels	10.00 to 10.50
Industrial malleable	10.00 to 10.50
Railroad malleable	10.00 to 10.50
Chemical borings	7.00 to 7.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$5.75 to $6.25
Scrap T rails	5.75 to 6.25
No. 2 steel	5.00 to 5.25
Breakable cast	6.00 to 6.50
Machine shop turnings	1.80 to 2.05
Bundled skeleton, long	4.25 to 4.50
Forge flashings	4.25 to 4.50
Blast furnace scrap	2.00 to 2.50
Shafting	11.00 to 11.25
Steel car axles	10.50 to 11.00
Cast iron borings, chemical	8.25 to 8.50
Stove plate	6.50

Per gross ton delivered consumers' yards:

Textile cast	$7.50 to $9.00
No. 1 machinery cast	7.50 to 9.00
Railroad malleable	11.00 to 11.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	*$7.00 †$8.00
No. 2 heavy melting steel	*5.50 to †6.50
Heavy breakable cast	6.50 to 7.00
No. 1 machinery cast	7.50 to 8.00
No. 2 cast	6.25 to 6.75
Stove plate	5.00 to 5.50
Steel car axles	10.75 to 11.50
No. 1 railroad wrought	7.50 to 8.00
No. 1 yard wrought, long	6.50 to 7.00
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rerolling	8.00 to 9.00
Short shoveling turnings	2.50 to 3.00
Machine shop turnings	2.50 to 3.00
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	3.00 to 4.00

Per gross ton, delivered local foundries:

No. machinery cast	$10.75
No. 1 hvy. cast (cupola size)	9.75
No. 2 cast	8.25

*For direct car loading only.
†Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$10.00
Scrap steel rails	9.00
Short shoveling turnings	5.50
Stove plates	$7.00 to 7.50
Steel axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 railroad wrought	7.00
Rails for rolling	10.50
No. 1 cast	9.00 to 9.50
Traincar wheels	9.00 to 9.50
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$8.75 to $9.25
No. 1 heavy melting	8.50 to 9.00
No. 2 heavy melting	6.50 to 7.00
No. 1 locomotive tires	9.50 to 10.00
Misc. stand-sec. rails	8.75 to 9.25
Railroad springs	9.50 to 10.00
Bundled sheets	6.75 to 7.25
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	4.75 to 5.25
Rails for rolling	9.75 to 10.25
Machine shop turnings	4.50 to 5.00
Heavy turnings	5.50 to 6.00
Steel car axles	10.50 to 11.00
Iron car axles	12.50 to 13.00
No. 1 railroad wrought	5.50 to 6.00
Steel rails less than 3 ft.	10.75 to 11.25
Steel angle bars	9.00 to 9.50
Cast iron carwheels	8.00 to 8.50
No. 1 machinery cast	9.00 to 9.50
Railroad malleable	8.50 to 9.00
No. 1 railroad cast	8.50 to 9.00
Stove plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$7.00 to $7.50
Borings and short turnings	5.00 to 5.50
Long turnings	$4.50 to $4.75
No. 1 machinery cast	9.00 to 9.50
Automotive cast	10.00 to 10.50
Hydraul. comp. sheets	7.00 to 7.50
Stove plate	6.50 to 7.00
New factory busheling	6.00 to 6.50
Old No. 2 busheling	4.25 to 4.75
Sheet clippings	3.50 to 4.00
Flashings	6.00 to 6.50
Low phos. plate scrap	7.50 to 8.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$5.50	$5.50
Rails scrap	6.00	6.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	5.50	6.00
Axles wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.50
Malleable	6.75	7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c
Iron, basic or foundry, Russian, aver. 65% iron	9c
Manganese, Caucasian, washed 52%	24c
Manganese, African, Indian, 44-48%	21c
Manganese, African, Indian, 49-51%	24c
Manganese, Brazilian, 46 to 48½	20c

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered*	$18.00 to $18.75
Tungsten, domestic scheelite, delivered†	17.00

Per Gross Ton

Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48% Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.
†Nominal; no supplies available.

Fluorspar

Per Net Ton

Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	$15.50 to $16.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	$15.50 to 16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville Prompt	$3.85
Foundry, f.o.b. Connellsville Prompt	$4.60 to 5.10
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	$9.25
Foundry, Birmingham	6.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	$1.80 to $2.05
Mine run coking coal f.o.b. W. Pa.	2.05 to 2.25
Gas coal, ¾-in. f.o.b. Pa. mines	2.25 to 2.55
Mine run gas coal, f.o.b. Pa. mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	4.00c
No. 4 industrial	3.50c

Per Gal. f.o.b. Baltimore

No. 3 distillate	4.00c
No. 4 industrial	3.50c

Per Gal. del'd Chicago

No. 3 industrial fuel oil	3.88c
No. 5 industrial fuel oil	3.38c

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.75c
No. 4 industrial	5.50c
No. 5 industrial	4.75c

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

	High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	55.00	45.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	
Ground fire clay, per ton	7.00	

Chrome Brick

Per Net Ton

Standard size	$45.00

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	$45.00
Chicago	55.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

Per Net Ton

Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	55.00
Imported grain magnesite, f.o.b. Baltimore and Chester, Pa.	65.00
Domestic grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.

Plates ..... 3.15c.
Structural shapes ..... 3.15c.
Soft steel bars and small shapes.. 2.90c.
Reinforcing steel bars ..... 2.90c.
Cold-finished and screw stock—
Rounds and hexagons .....*3.45c.
Squares and flats .....*3.45c.
Hoops and bands under ¼ in..... 3.20c.
Hot-rolled annealed sheets (No. 24), 10 bundles or more ..... 3.30c.
Galv. sheets (No. 24), 25 or more bundles ..... 3.95c.
Hot-rolled sheets (No. 10)..... 2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)..... $3.69
Spikes, large ..... 2.90c.
Track bolts, all sizes, per 100 count, 65 per cent off list.
Machine bolts, 100 count, 65 per cent off list.
Carriage bolts, 100 counts, 65 per cent off list.
Nuts, all styles, 100 count, 65 per cent off list.
Large rivets, base per 100 lb.....$3.50
Wire, black, soft ann'l'd, base per 100 lb. .....*2.70c.
Wire, galv. soft, base per 100 lb..*2.925c.
Common wire nails, per keg....*2.834c.
Cement coated nails, per keg....*2.834c.

Base plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 1999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

Base per Lb.

Plates and structural shapes.....3.20c.
Soft steel bars .....2.95c.
Cold fin. steel bars and shafting Rounds and hexagons ..... 3.50c.
Flats and squares ..... 3.50c.
Hot-rolled strip ..... 3.30c.
Hot-rolled annealed sheets (No. 24) 3.85c.
Galv. sheets (No. 24)..... 4.55c.
Hot-rolled sheets (No. 10)..... 3.05c.
Spikes (9/16 in. and lighter) .... 3.50c.
Track bolts ..... 4.65c.
Rivets, structural (keg lots) .... 3.50c.
Rivets, boiler (keg lots) ..... 3.60c.

Per Cent Off List

Machine bolts ..... 60 and 5
Carriage bolts ..... 60 and 5
Coach and lag screws ..... 60 and 5
Hot-pressed nuts, sq. tap. or blank ..... 60 and 5
Hot-pressed nuts, hex. tap or blank ..... 60 and 5
Hot-forged set and cap screws..... 50
Cup point set screws..... 70 and 10
Flat head bright wood screws.37½ and 10
Spring cutters 50
Stove bolts in full packages ..70 and 10
Nuts, hot tank rivets, 7/16 in. and smaller 57½
Boiler washers, $1.50 off list
No. 8 black ann'l'd wire per 100 lb..$3.85
Com. wire nails, base per keg .. 3.05c.
Cement c't'd nails, base per keg.. 3.05c.

NEW YORK

Base per Lb.

Plates ¼ in. and heavier..... 3.40c.
Structural shapes ..... 3.37c.
Soft steel bars, small shapes..... 3.22c.
Iron bars ..... 3.22c.
Iron bars, swed. charcoal ..6.50 to 7.25c.
Cold-fin. shafting and screw stock; Rounds and hexagons ..... 3.92c.
Flats and squares ..... 4.42c.
Cold-roll. strip, soft and quarter hard ..... 3.32c.
Hoops ..... 3.52c.
Bands ..... 3.52c.
Hot-rolled sheets (No. 10) ..... 3.27c.
Hot-rolled ann'l'd sheets (No. 24*) 3.85c.
Galvanized sheets (No. 24*)..... 4.50c.
Long terne sheets (No. 24)..... 5.20c.
Standard tool steel ..... 11.00c.
Wire, black annealed (No. 10) ... 3.25c.
Wire, galv. (No. 10) ..... 3.85c.
Tire steel, 1 x ½ in. and larger. 3.65c.
Open hearth spring steel.. 4.00c. to 10.00c.
Common wire nails, base, per keg.. $3.21

Per Cent Off List

Machine bolts, cut thread: ¾ in. to 1 in. dia. inclusive 60
Over 1 in. dia. 50
Carriage bolts, cut thread: ½ in. to ⅝ in. dia. inclusive 60
Over ⅝ in. dia. 50

Per 100 Ft.

Boiler tubes, lap welded, 2-in. $18.05
Seamless welded, 2-in. 19.24
Charcoal iron, 2-in. 24.94
Charcoal iron, 4-in. 63.65

Nos. 28 and lighter, 36 in. wide, 20c. per 100 lb.

ST. LOUIS

Base per Lb.

Plates and struc. shapes ..... 3.44c.
Soft steel or iron ..... 3.19c.
Cold fin. rounds, shafting, screw stock ..... 3.74c.
Cold-rolled annealed sheets (No. 24) 4.14c.
Galv. sheets (No. 24)..... 4.79c.
Hot-rolled sheets (No. 10)..... 3.29c.
Galv. corrug. sheets (No. 24)..... 4.14c.
Galv. corrug. sheets ..... 4.79c.
Structural rivets ..... 3.84c.
Boiler rivets ..... 3.94c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller.... 55
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts
1000 lb. or over 60
200 to 999 lb. .....55 and 5
100 to 199 lb. .....50 and 5
Less than 100 lb. 50
*No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier ..... 2.95c.
*Structural shapes ..... 2.95c.
*Soft steel bars, small shapes, iron bars (except bands) ..... 2.90c.
‡Reinforc. steel bars, sq. twisted and deformed ..... 2.955c.
Cold-finished steel bars ..... 3.75c.
*Steel hoops ..... 3.40c.
*Steel bands, No. 12 and 3/16 in., incl. ..... 3.15c.
Spring steel ..... 5.00c.
†Hot-rolled anneal. sheets (No. 24) 3.55c.
†Galvanized sheets (No. 24) .... 4.25c.
*Hot-rolled annealed sheets (No. 10) ..... 3.05c.
Diam. pat. floor plates, ¼ in. .... 4.95c.
Swedish iron bars ..... 6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices subject to deduction on orders aggregating 4000 lb. or over.
†For 50 bundles or over.
‡For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes ..... 3.31c.
Soft steel bars ..... 2.95c.
Reinforc. steel bars..... *2.10c.
Cold-finished steel bars ..... 3.40c.
Flat-rolled steel under ¼ in..... 3.30c.
Cold-finished strip ..... 12.00c.
Hot-rolled annealed sheets (No. 24) 3.95c.
Galvanized sheets (No. 24)..... 4.61c.
Hot-rolled sheets (No. 10) ..... 3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets ..... 3.50c.
Black ann'l'd wire, per 100 lb.....$2.85
No. 9 galv. wire, per 100 lb..... 3.00
Com. wire nails, base per keg..... 2.40

*Plus mill, size and quantity extras.
†Outside delivery 10c. less.

CINCINNATI

Base per Lb.

Plates and struc. shapes ..... 3.45c.
Bars, soft steel or iron ..... 3.25c.
New billet reinforc. bars ..... 3.10c.
Rail steel reinforc. bars 3.10c
Hoops and bands, 3/16 in. and lighter 3.60c
Cold-finished bars 3.70c
Hot-rolled annealed sheets (No. 24) 4.00c.
Galv. sheets (No. 24) 4.85c
Hot-rolled sheets (No. 10) 3.35c
Structural rivets 4.35c
Small rivets .....55 per cent off list
No. 9 ann'l'd wire, per 100 lb. ..$3.00
Com. wire nails, base per keg (10 to 49 kegs) 2.65
Larger quantities 2.50
Cement c't'd nails, base 100-lb. keg. 2.95
Chain, 1-in., per 100 lb. 8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in...$17.99
4-in. 41.69
Lap-welded steel boiler tubes, 2-in. 16.61
4-in. 38.72

BUFFALO

Base per Lb.

Plates 3.40c
Struc. shapes 3.30c
Soft steel bars 3.10c
Reinforcing bars ..... 2.10c.
Cold-fin. flats and sq. 3.55c
Round and hex. 3.55c
Cold-rolled strip steel 5.25c
Hot-rolled annealed sheets (No. 24) 4.05c
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide 3.67c
Galv. sheets (No. 24) 4.65c
Bands 3.57c
Hoops 3.57c
Hot-rolled unannealed sheets..... 3.35c
Com. wire nails, base per keg $2.60
Black wire, base per 100 lb. 3.45c

BOSTON

Per Lb

Beams, channels, angles, tees, zees 3.42c
H beams and shapes 3.42c
Plates—sheared, tank and univ. mill, ¾ in. thick and heavier .. 3.43c
Floor plates, diamond pattern 5.18c
Bar and bar shapes (mild steel) .. 3.25c
Bands 3/16 in. thick and No. 12 ga. incl. .....3.50c. to 4.50c
Half rounds, half ovals, ovals and bevels 4.50c
Tire steel 4.50c
Cold finished rounds and hexagons. 3.70c
Cold-rolled strip steel 5.20c
Cold-finished squares and flats ... 4.20c
Blue annealed sheets, No. 10 ga. .. 3.25c
One pass cold-rolled sheets No. 24 ga. 3.50c
Galvanized steel sheets, No. 24 ga. 4.60c
Lead coated sheets, No. 24 ga. 5.65c

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.55c.	3.70c.	3.55c
Shapes, standard	3.55c.	3.70c.	3.55c.
Soft steel bars	3.60c.	3.70c.	3.55c.
Reinforcing bars	3.50c.	3.50c.	3.50c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.75c.	3.80c.	3.75c.
Galv. sheets (No. 24)	5.00c.	5.05c.	5.00c.
Cold finished steel Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails —base per keg less carload	$3.40	$3.25	$3.35

All items subject to differentials for quantity.

Minor Price Changes Made

NEW prices of 1.80c. a lb., Cleveland, on merchant axle steel bars and of 1.95c. a lb., Cleveland, on axle steel concrete reinforcing bars go into effect on Aug. 10. A price of 6½c. a lb., Syracuse, on tool steel (open-hearth chrome magnet steel, chrome 2.50 to 4 per cent) also is effective Aug. 10.

A price of 39c. a lb., Pittsburgh, on stainless steel plates (type No. 329, C 0.10 per cent max., Cr 25 to 30 per cent, Ni 3 to 5 per cent and Mo 1 to 1.50 per cent) is effective Aug. 11.

A price of 11.80c. a lb., Worcester, Mass., on bright, untempered valve spring wire, went into effect Aug. 3. Swedish oil-tempered spring wire was quoted at 11.25c. a lb., Worcester, beginning Aug. 3.

No. 16 gage galvanized corrugated, copper steel, culvert sheets (regular coating) will be quoted at 2.90c. a lb., Gary, effective Aug. 12.

All Metals Continue Inactive As Consuming Operations Slacken

Spelter Sales Total About 2200 Tons, Mostly Prompt at 4.30c.; Lead Bookings Decline—Copper and Tin Very Quiet

NEW YORK, Aug. 7.—The copper code authority has announced that holders of copper stocks may now participate in sales under certain conditions. This will probably enable some speculative holdings to be liquidated, although the owners may encounter difficulty in finding buyers. At present there is very little new copper being sold, and the market continues in a very listless condition. However, most sellers report good deliveries on contract tonnages, thereby indicating that consuming industries are still fairly active. Nevertheless it will probably be more than a month before fabricators will return to the market for any volume of metal. The situation abroad is increasingly discouraging. If Germany were to return as a more substantial buyer the market might develop more stability, but such action is doubtful as the economic dictator of the Third Reich has now rationed metal purchases for all industries. The steady pressure of metal from American and other sources into a quiet European market has inevitably depressed values and British warehouse stocks are slowly mounting. The market abroad was this morning quoted at about 7.30c. a lb., c.i.f. usual Continental base ports.

Tin

This market is still marked by a complete absence of consuming demand. During the week English prices declined an average of almost £4, and Straits tin at New York dropped 35 to 40 points to today's level of 51.75c. a lb. A few prompt orders were attracted by the lower price level, but there was no inquiry for forward positions. Perhaps industrial buyers here expect lower levels to be reached, although no pronounced weakness is expected abroad so long as the buffer pool purchases offerings to support the market. There is a possibility, however, that the pool will not be able to support prices much longer, as there is yet no danger of a shortage of metal and the full effect of recent increases in production quotas has yet to make itself apparent. The world's visible tin stocks dropped 938 tons in July, and United States stocks now stand at about 6461 tons, of which 2135 tons are in warehouses and the remainder is afloat or landing.

Zinc

Total weekly bookings are still quite low, in keeping with the general slackening of activity in spelter-consuming industries. Leading sellers disposed of about 2200 tons last week at 4.30c. a lb., as compared with 2000 tons in each of the two preceding weekly periods. Although most users are limiting their purchases to routine demands, it is estimated that the industry is somewhat underbought. This fact, coupled with prospective higher prices for concentrates, is being reflected in steadier Prime Western prices. The market is still unchanged at 4.65c. a lb., New York, and 4.30c., East St. Louis, and it is doubtful whether these prices will be shaded to any great extent even though several sellers are desirous of business. In the Joplin area production of ore was advanced to 6500 tons last week, sales rose to 5730 tons and shipments of 5876 tons were reported. Stocks now stand at the comparatively low level of 12,460 tons, and the price is unchanged and steady at $27 and $28 a ton respectively for flotation and prime grades of concentrates.

Lead

Consumer demand has dwindled to occasional carlots, which aggregate less than the average daily ore intakes of leading smelters. The present demand is mostly for September delivery, for which month about 8000 tons have already been booked. One large seller is still quoting five points above the market on competitive business, which would seem to indicate that it is satisfied with the tonnage secured in July and has no desire to contract in a large way through September at the current low price level. The trade is seemingly unconcerned with present inactivity, since well over 31,000 tons of metal will be shipped in August. However, it is quite possible that a large proportion of these shipments will not go into immediate consumption, and as a consequence the demand for the next two months may not come up to expectations. Consequently the price will probably not show much strength during that period.

The Week's Prices, Cents Per Pound for Early Delivery

	Aug. 1	Aug. 2	Aug. 3	Aug. 4	Aug. 6	Aug. 7
Electrolytic copper, N. Y.*‡	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, Eastern delivery*	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, N. Y.	51.75	51.65	51.75	...	51.75	51.75
Zinc, East St. Louis	4.30	4.30	4.30	4.30	4.30	4.30
Zinc, New York	4.65	4.65	4.65	4.65	4.65	4.65
Lead, St. Louis	3.60	3.60	3.60	3.60	3.60	3.60
Lead, New York	3.75	3.75	3.75	3.75	3.75	3.75

*Blue Eagle copper. ‡Refinery price ¼c. higher in Connecticut Valley.

Quotations below cover wholesale lots, f.o.b. New York.

Aluminum, 98-99 per cent, 22.90c. a lb.
Aluminum, remelt, No. 12 (grade 3), 12.75c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb.; shot and ingot, remelt electro, 36c. a lb.
Antimony, 8.12½c. a lb. Quicksilver, per flask of 76 lb., $75.
Brass ingots, 95-5-5-5, 8.75c. a lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	53.25c. to 54.25c.
Tin, bar	55.25c. to 56.25c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.50c.
*Seamless brass tubes	17.00c.
*Seamless copper tubes	17.25c.
*Brass rods	13.00c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.50c. to 5.50c.
Lead, bar	5.50c. to 6.50c.
Lead, sheets	7.50c.
Antimony, Asiatic	9.75c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	32.50c. to 33.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.25c.
Tin, bar	57.25c.
Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	4.75c. to 5.00c.
Lead, bar	7.75c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	59.25c.
Solder, ½ and ½	33.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.25c.	7.00c.
Copper, hvy. and wire	6.00c.	6.75c.
Copper, light and bottoms	5.00c.	5.87½c.
Brass, heavy	3.25c.	3.87½c.
Brass, light	2.87½c.	3.50c.
Hvy. machine composition	4.75c.	5.25c.
No. 1 yel. brass turnings	4.37½c.	5.12½c.
No. 1 red brass or compos. turnings	4.25c.	5.25c.
Lead, heavy	2.87½c.	3.37½c.
Zinc	2.25c.	3.00c.
Cast aluminum	9.62½c.	10.75c.
Sheet aluminum	11.00c.	12.50c.

World's Largest Tapered Roller Bearings

THE four largest tapered roller bearings in the world are included in the complete bearing equipment which British Timken, Ltd., is supplying for the new steel rolling mill which is being erected at the Renault automobile works in France. Each of these bearings is 4 ft. 3 in. in diameter and weighs over 3½ tons. The complete equipment also includes 64 smaller bearings of various sizes.

The size of the larger bearings necessitated special manufacturing methods and specially designed equipment in some stages of production. The shaping of the inner cones on a Richard's boring mill involved the removal of approximately 392 lb. of steel from each cone. The operation occupied about 47 hr. for each cone before the correct tapered shape was obtained, with sufficient metal left for the subsequent grinding operations.

Heat treatment was applied in gas-fired furnaces. Quenching between the heat treatment stages, and also at the end, was carried out in a water-cooled oil bath over which special lifting tackle was erected. Special jigs were also designed to retain the shape of the components during quenching operations. On test the degree of eccentricity in a completely assembled bearing was found to be no more than eight ten-thousandths of an inch, which for all practical purposes is negligible in so large a bearing. The bearings were manufactured in Birmingham.

Financial Notes

CLARK EQUIPMENT CO., for the quarter ended June 30, reports net income of $97,972 against net loss of $14,892 in the corresponding period of 1933. For the first six months of 1934 the company reports net income of $216,532 against a net loss of $148,-231 for the first half of last year.

* * *

MAYTAG CO. reports net income of $586,192 for the second quarter of 1934. This is to be compared with net income of $171,376 in the like period of 1933. Current assets of June 30 last were $7,397,317, including $5,338,-529 cash and marketable securities. A year earlier current assets were $4,-580,827 including cash and marketable securities of $3,682,868.

* * *

DEERE & CO. has declared a dividend of 10c. a share on the cumulative preferred stock. This is double the rate that has been paid for the last year and a half. The regular quarterly rate of 35 cents a share was discontinued on June 1, 1932.

* * *

INLAND STEEL CO. and subsidiaries report net profit for the second quarter of $2,129,197.65. This is after deduction of bond interest and depreciation aggregating $1,312,-016.55.

* * *

CRUCIBLE STEEL CO. OF AMERICA and subsidiaries in the first half showed net profit $712,034, after deductions, equivalent to $2.85 a share on 7 per cent preferred stock. The company reported net loss of $1,024,772 in the first half last year.

* * *

BLAW-KNOX CO. and subsidiaries in the first half reported net income of $105,214, after deductions, equivalent to 8c. a share on stock outstanding. The company sustained net loss of $102,075 in the first half last year.

A NET profit of $315,727 for the half-year period ended June 30, 1934, has been reported by the United States Pipe & Foundry Co., Burlington, N. J. The total earnings for the six months were $662,716 excluding $25,950 in dividends on preferred stock owned by the company and after deducting all operating, maintenance and sales expense.

* * *

A NET profit of $2,066,755 for the half-year period ended June 30, 1934, has been reported by the National Lead Co., 111 Broadway, New York. The total gross income for the period was $7,254,528, and administration, selling and tax outlays came to $4,532,259.

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Iron and Steel Exports and Imports Lower in June

BOTH exports and imports were smaller in June than in the previous month. Exports, however, were more than twice as large as in June, 1933. Imports showed a decline as compared with the corresponding month of last year.

Decreases in imports as compared with May included: scrap, 3521 tons; pig iron, 3460 tons; and barbed wire, 453 tons. While there were gains in 19 products as against declines in 13, the increases were small.

Pig iron was the leading product imported. Of a total of 5168 tons brought in during the month, British India supplied 2711 tons and the Netherlands, 1342 tons.

Chile again supplied the lion's share of the iron ore delivered from foreign ports, shipping 108,950 tons out of a total of 188,214 tons. Of the 15,505 tons of manganese concentrates imported, Soviet Russia supplied 5716 tons, Brazil 4673 tons and the Gold Coast 5089 tons.

Distribution of exports and imports by classes and origins is shown in the tables.

Imports of Iron and Steel Products into the United States

(In Gross Tons)

	June		Six Months Ended June	
	1934	1933	1934	1933
Pig iron	5,168	11,230	65,386	62,793
Sponge iron	258	105	690	220
Ferromanganese and spiegeleisen*	3,761	6,911	17,057	19,226
Ferrochrome†	...	...	34	21
Ferrosilicon‡	298	47	531	51
Other ferroalloys	13	101	46	102
Scrap	3,454	4,058	27,202	9,518
Pig iron, ferroalloys and scrap	*12,952*	*22,452*	*110,946*	*91,931*
Steel ingots, blooms, etc	268	242	663	351
Wire rods	1,577	1,431	6,732	6,065
Semi-finished steel	*1,845*	*1,673*	*7,395*	*6,416*
Concrete reinforcement bars	95	313	482	1,585
Hollow steel bars	75	30	381	476
Merchant steel bars	1,881	1,844	9,196	8,876
Iron slabs	...	...	1	1
Iron bars	51	46	346	195
Boiler and other plate	10	2	81	111
Sheets, skelp, and saw plate	132	626	2,185	5,176
Tin plate	36	6	91	188
Structural shapes	2,174	3,329	10,255	12,800
Rails and rail fastenings	527	110	1,626	816
Welded pipe	277	253	1,023	1,675
Other pipe	143	176	1,767	680
Barbed wire	880	368	5,408	4,885
Round iron and steel wire	228	169	1,358	1,298
Flat wire and strip steel	125	102	703	431
Wire rope and strand	120	125	707	767
Other wire	163	105	386	878
Hoops and bands	1,669	1,982	7,578	8,417
Nails, tacks and staples	873	475	3,503	3,368
Bolts, nuts, and rivets	12	16	166	139
Other finished steel	732	19	1,342	271
Rolled and finished steel	*10,473*	*10,956*	*48,585*	*54,033*
Cast iron pipe and fittings	...	51	7	386
Castings and forgings	88	116	705	494
Total	24,858	34,368	167,638	152,260

*Manganese content only.
†Chromium content only.
‡Silicon content only.

Exports of Iron and Steel from the United States

(In Gross Tons)

	June		Six Months Ended June	
	1934	1933	1934	1933
Pig iron	266	94	1,892	1,185
Ferromanganese	2	1	16	2
Scrap	143,115	64,852	738,848	246,426
Pig iron, ferroalloys and scrap	*143,383*	*64,959*	*740,756*	*247,613*
Ingots, blooms, billets, sheet bars	4,025	89	8,637	755
Skelp	3,976	2,570	40,785	4,662
Wire rods	2,539	1,312	15,798	6,226
Semi-finished steel	*10,540*	*3,971*	*65,220*	*11,643*
Steel bars	2,670	2,066	21,710	8,873
Alloy steel bars	124	68	1,709	610
Iron bars	46	43	554	204
Plates, iron and steel	3,780	934	17,657	2,684
Sheets, galvanized steel	4,866	3,278	30,766	14,968
Sheets, galvanized iron	80	128	773	494
Sheets, black steel	9,556	1,876	42,691	12,533
Sheets, black iron	294	266	1,846	844
Hoops, bands, strip steel	2,944	2,134	16,608	8,594
Tin plate, terne plate	10,206	5,651	97,137	24,073
Structural shapes, plain material	2,066	819	14,289	3,680
Structural material, fabricated	1,409	1,397	9,109	6,584
Tanks, steel	301	329	3,726	1,056
Steel rails	1,865	524	42,754	6,702
Rail fastenings, switches, spikes, etc	541	304	10,617	1,292
Boiler tubes	655	236	3,393	1,898
Casing and oil line pipe	5,968	1,947	34,483	15,117
Pipe, black and galvanized, welded steel	3,242	2,641	22,659	11,775
Pipe, black and galvanized, welded iron	157	234	1,155	668
Plain wire	3,249	1,673	18,667	4,590
Barbed wire and woven wire fencing	3,815	2,822	19,335	11,046
Wire cloth and screening	82	76	399	296
Wire rope	249	157	1,439	831
Wire nails	1,578	1,141	7,573	3,802
Other nails and tacks	479	102	2,641	1,797
Horseshoes	6	22	58	54
Bolts, nuts, rivets and washers, except track	436	263	2,440	1,547
Other finished steel	770	351	3,359	1,733
Rolled and finished steel	*61,425*	*31,282*	*329,547*	*148,255*
Cast iron pipe and fittings	2,421	1,546	7,395	4,193
Malleable iron screwed fittings	224	159	1,480	939
Carwheels and axles	343	285	1,847	2,191
Iron castings	512	167	3,915	1,074
Steel castings	193	41	1,002	312
Forgings	365	149	2,012	1,511
Castings and forgings	*3,958*	*2,347*	*17,651*	*10,211*
Total	219,406	102,559	1,253,174	517,719

Sources of American Imports of Iron and Manganese Ores

(In Gross Tons)

	June		
	Iron Ore		Manganese Ore
	1934	1933	1934
Canada	7,186	...	25
Cuba	33,000	22,000	...
Chile	108,950	...	...
Spain	...	109	...
Norway	7,758	...	...
Sweden	...	...	...
French Africa	11,550	...	...
Russia	7,300	9,200	5,716
India	...	...	...
Brazil	...	...	4,673
West Africa	...	...	5,089
Other countries	12,470	7,803	...
Total	188,214	39,412	15,505

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	June		Six Months Ended June	
	1934	1933	1934	1933
United Kingdom	...	...	150	5,000
British India	2,711	5,047	17,728	28,768
Germany	...	...	...	234
Netherlands	1,342	5,969	40,605	23,580
Canada	729	112	4,661	956
France	...	...	...	...
Belgium	...	...	50	...
Norway	169	102	962	102
Sweden	40	...	265	2,803
All others	177	...	901	1,628
Total	5,168	11,230	65,386	62,827

Cleveland Court Decision Speeds Housing Program

WASHINGTON, Aug. 7.—The administration proposes to proceed speedily with its nation-wide program of slum clearance now that the Government's right to acquire land for this purpose and for low-cost housing was upheld by a recent decision of the United States District Court of Ohio at Cleveland. The housing project is one of the divisions of the Public Works Administration which has allotted it $125,000,000 to engage in its program under Col. Horatio B. Hackett. The Cleveland project is one of more than 30 housing projects under consideration. The division is nearly ready to start demolition on the university project in Atlanta. The first project, that at Alta Vista, Va., has been completed.

Progress Reported On Golden Gate Bridge

CLOSE to 1200 men were employed in the San Francisco bay district on work directly pertaining to the Golden Gate Bridge project during the past week, according to the report of Chief Engineer Joseph B. Strauss, filed July 29, with General Manager James Reed of the Golden Gate Bridge and Highway District for transmission to the board of directors.

Of these approximately 200 were working on the south pier fender structure and the Presidio approach structure, all structural work on the Marin side having been completed as far as possible at this stage of construction.

But four more fender units remain to be put in to complete the concrete base of the fender structure for the south pier. To date two units have been concreted to their final elevation of 15 ft. above sea level; 14 units have been concreted to a point 40 ft. below sea level and one to a point 60 ft. below sea level.

The steel working trestle now extends over 17 units, a distance of 486 ft. More than 36,684 cu. yd. of concrete have been poured on the fender structure, representing a weight of more than 73,000 tons.

In the eastern shops the tower saddles are being machined, while at the plant of the John A. Roeblings Sons Company, 7820 tons of cable wire, or 36.4 per cent of the total amount, has been completed. Miscellaneous cable fittings are in process of fabrication.

WASHINGTON, Aug. 3.—The Bureau of Supplies and Accounts, Navy Department, will open bids Aug. 21 for 582 tons of shapes for delivery at various navy yards.

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British Pig Iron Producers Curtail; Finished Steel Demand Sustained

LONDON, ENGLAND, Aug. 7 (*By Cable*).—British iron and steel markets have been influenced by the holidays, but less so than in previous years. Many pig iron makers have curtailed operations. New business is quiet, but substantial replacement orders are confidently expected by the end of the month. Prices may advance in view of increasing costs of ore and fuel.

The domestic building and motor trades are taking large quantities of finished steel and overseas demand is good, particularly from China, Russia and Argentine, mainly for rails.

Tin plate prices are firm, with good domestic and export inquiry and fair business. Production is at 60 per cent capacity and may rise to 70 per cent.

Continental iron and steel markets are also affected by the holidays. Russia has bought 20,000 tons of steel products, mainly billets and plates. The Near East, South Africa and South America are the most active export markets.

British and Continental prices are unchanged.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9
Billets, open-hrth.	£5 10s. to £5 15s.
Tin plate, per base box	18s. to 18s. 3d.
Steel bars, open-hearth	£7 17½s.
Beams, open-hrth.	£7 7½s.
Channels, open-hearth	£7 12½s.
Angles, open-hearth	£7 7½s.
Black sheets, No. 24 gage	£9 5s.
Galvanized sheets, No. 24 gage	£11 5s.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel bars, merchant	£3 5s.
Sheet bars	£2 8s.
Plates, ¼ in. and up	£4
Plates, 3/16 in. and 5 mm.	£4 2s. 6d.
Sheets, ⅛ in.	£4 7s. 6d.
Beams, Thomas	£3 2s. 6d.
Angles (Basic)	£3 2s. 6d.
Hoops and strip base	£4 2s. 6d.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

Udylite Process Co., Detroit, has changed its address from 3939 Bellevue Avenue to 1651 East Grand Boulevard.

Harold E. Trent Co., manufacturer of electric heating units and electric furnaces, Philadelphia, has opened an office at 143 Liberty Street, New York, in charge of A. H. Gurtner.

STRONG STEEL CASTINGS

Inventories Will Last Consumers Through August — Steel Ingot Output Rises Slightly to 24 Per Cent of Capacity

CLEVELAND, Aug. 7.—The first week of August has brought little change to the steel industry in this district. Orders are still confined to very small lots and consumers are showing little interest in forward requirements. Manufacturers in the territory have reduced their schedules to low levels and inventories accumulated during June seem likely to supply August needs.

Steel ingot production in the Cleveland-Lorain territory has increased slightly to 24 per cent of capacity. This is due to the fact that an open-hearth plant which ran only half of last week is operating six days in the current period. The number of furnaces active has not changed.

With substantial orders from the automobile industry apparently delayed until after Labor Day, there is now little likelihood of much improvement in steel operations until September. Building operations are light and structural steel awards are lacking. Several small inquiries for sheet steel piling have appeared, but the aggregate tonnage involved is not large.

Pig Iron

Shipments thus far in August show little change from the July rate, which was exceedingly low. Sales are confined to small lots and consumers are showing no interest in their forward requirements. The foundry melt in this territory reflects seasonal curtailment, although makers of castings for the railroads are still fairly busy.

Iron Ore

July shipments from Lake Superior ports totaled 4,432,140 tons, compared with 4,460,807 tons in the previous month and with 3,429,683 tons in July, 1933. The gain over July of last year was 1,002,457 tons, or nearly 30 per cent. The movement up to Aug. 1 this season totaled 11,523,525 tons, a gain of 5,828,829 tons or 102 per cent over the 5,694,696 tons brought down prior to Aug. 1, 1933.

Bolts, Nuts and Rivets

Some makers report a slight improvement in inquiry, but the market generally is very dull. No pressure is being exerted against prices and the market is considered very firm.

Sheets

In the absence of demand from the automobile industry, the sheet market continues very dull. Barrel makers are still well supplied with stock and most of them have no intention of entering the market this month. Miscellaneous manufacturing demand is at a low ebb and, with industrial activity in the usual summer slump, stocks are not being reduced very rapidly. Prices on the common finishes of sheets seem to be stabilized, and sellers are anxious to rebuild the confidence of consumers.

Strip Steel

No improvement in demand is reported, but mills believe that August

Richmond, Va., 700 tons, bridge

Louisville & Nashville Railroad, bridge work in Kentucky.

Springdale, Ark., 100 tons, bridge

CENTRAL STATES

Oxford, Ohio, 200 tons, Miami dormitory addition.

Detroit, 800 tons, wash house and

Lots at Clevelan

the [illegible] Labor Day, a sizable tonnage of rip is being taken for highway road guards. Cooperage stock is unusually quiet.

Bars, Plates and Shapes

In the absence of large structural steel and reinforcing bar awards, the market for heavy hot-rolled product is very dull. The Y.M.C.A. in Toledo, requiring 800 tons of shapes, is still pending, but no other sizable projects are before the trade. A few small sheet steel piling jobs are coming out in the next month, principally for harbor improvement along Lake Erie. Demand for plates is very quiet, with the boiler and shipbuilding industries both inactive.

Scrap

The market is weaker, but no sales of heavy melting steel or hydraulic bundles have been made which might justify lower quotations. Mills are showing no interest in purchases and quite a little distress material is appearing in the absence of definite shipping points. Machine shop turnings and short shoveling steel turnings have declined 50c. a ton and the blast furnace grades are weaker.

Brazil Favorable Market For Iron and Steel

BRAZIL affords a favorable market for imported iron and steel products, according to Commercial Attache R. H. Ackerman, Rio de Janeiro, in a report to the Commerce Department.

Domestic production, he points out, has increased with the insistent demand for those products which lend themselves to economical production within the country, but with the expansion in manufacturing, housing, transportation and corresponding improvement in the general living standards, local production has not kept pace with the increasing requirements. The increased local output, the report states, has not had the effect of curtailing imports.

Owing to climatic conditions and low purchasing power of a large part of the population, the per capita use of iron and steel in Brazil is still relatively small. Notwithstanding, the types of iron and steel products entering into commerce in Brazil are as broad as in any highly industrial country, ranging from manufactures for reworking purposes to specialized manufactures of high carbon steel and alloys. In general, it may be said that Brazil has a limited production of iron and steel products which require simple processing, whereas it relies on importations of manufactures requiring a greater element of technical skill or heavy capital investment.

Imports in 1933, covering 25 of the principal classifications, amounted to 240,381 metric tons, an increase of more than 50 per cent over the preceding year. Domestic production in 1933 reached higher levels than ever before attained. During the first three months of the current year Commercial Attache Ackerman states inquiries were numerous for all classes of structural steel, tin plate and tubes, while construction activity continued at a high level with the market seemingly healthy.

Railroad Equipment

Boston & Maine has ordered 21 streamlined suburban coaches and 10 deluxe streamlined passenger coaches from Pullman-Bradley Corpn., Worcester, Mass. The cars are to be built of Corten high-tensile steel.

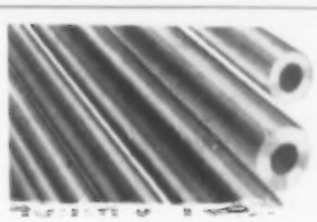
Seaboard Air Line has ordered five locomotives from Baldwin Locomotive Works.

Reinforcing Steel

Awards 1700 Tons—New Projects 5700 Tons

Newark, N. J., 800 tons, Prudential Insurance apartments, to Rawlins Co.

Haskell, N. J., 350 tons, building for General Cable Works, to Rawlins Co.



TOOL STEEL TUBING

June production of Bessemer and open-hearth ingots as reported by the American Iron and Steel Institute, amounted to 1,472,584 gross tons, a decrease of 51.2 per cent from the 3,015,972 tons produced in June. In July, 1933, production was 3,168,354 tons. Steel was made last month at the rate of 58,903 tons daily, or at 26.75 per cent of capacity, which stood 68,472,813 gross tons on Dec. 31, as compared with 67,386,130 tons one year before. June operations were at 52.68 per cent of capacity.

Ingot output in the first seven months of the year amounted to 17,653,473 tons, as compared with 12,042,742 tons in the corresponding 1933 period.

MONTHLY PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

Reported for 1933 by Companies Which Made 97.82 Per Cent of 1933 Ingot Output

1933	Open-Hearth	Bessemer	Calculated Output All Companies Monthly	Calculated Output All Companies Daily	No. of Working Days	Per Cent Operation‡
January	885,663*	109,000	1,016,870†	39,110†	26	17.99†
February	922,798*	126,781	1,073,012†	44,709†	24	20.57†
March	784,111*	94,509	898,236†	33,268†	27	15.30†
April	1,180,823*	135,217	1,345,422†	53,817†	25	24.76†
May	1,716,425*	216,841	1,976,428†	73,201†	27	33.68†
June	2,211,652*	296,765	2,564,420†	98,632†	26	45.37†
July	2,743,326*	355,836	3,168,354†	126,734†	25	58.30†
Seven Months	10,444,798	1,334,949	12,042,742	66,904	180	30.78
August	2,430,663*	370,370	2,863,569†	106,058†	27	48.79†
September	1,991,204*	242,014	2,283,079†	87,811†	26	40.40†
October	1,847,690*	191,673	2,084,894†	80,188†	26	36.89†
November	1,331,029*	156,939	1,521,189†	58,507†	26	26.92†
December	1,629,495*	129,834*	1,798,606†	71,944†	25	33.10†
Total	19,674,879*	2,425,779*	22,594,079†	72,884†	310	33.53†

* Revised. † Adjusted.

‡ The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1932, of 67,386,130 gross tons for open-hearth and Bessemer steel ingots.

Reported for 1934 by Companies Which Made 99.39 Per Cent of Ingot Production in 1933

1934						
January	1,786,467	172,489	1,970,979*	72,999*	27	33.15*
February	1,993,638	175,873	2,182,826*	90,951*	24	41.31*
March	2,540,143	203,904	2,760,888*	102,255*	27	46.44*
April	2,622,372	257,482	2,897,529*	115,901*	25	52.64*
May	3,000,624	331,620	3,352,695*	124,174*	27	56.39*
June	2,714,983	282,592	3,015,972	115,999	26	52.68
July	1,343,732	119,869	1,472,584	58,903	25	26.75
Seven Months	16,001,959	1,543,829	17,653,473	97,533	181	44.30

* Revised.

‡ The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1933, of 68,478,813 gross tons for open-hearth and Bessemer steel ingots.

Automobile Workers Secede in Large Groups

(Concluded from Page 48)

stoutly defended Mr. Byrd. In fact, Mr. Greer is understood to be the spokesman for Mr. Byrd in local labor circles. Paradoxically Mr. Greer defends Mr. Byrd, who has supported the conciliatory policy of Dr. Leo Wolman on the Automobile Labor Board, yet is critical of the American Federation of Labor for its program of inaction. He says that "in the San Francisco strike the American Federation of Labor did not declare itself until it found out that the public was against the strike. Then it too came out against the strike. The Federation is afraid to take any direct action. It's always playing politics and it's against strikes anyway because it has to pay striking workers benefits out of union dues."

The dissenters charge that 35c. out of every dollar of their dues goes to the Federation and is spent without their having a voice. Mr. Collins minimizes the present difficulties, asserting that the secession at the Hudson and Oldsmobile unions occurred without authority of the members of those chapters and that the matter will be straightened out shortly.

More Sheet Metal In Future Buildings

THE future building will tend more and more to be constructed almost entirely of steel and glass with an insulating material which will have a good value in re-use. Such is the view of Francis Lorne, fellow of the Royal Institute of British Architects, expressed in a paper read before the recent international congress for steel development held in London, England.

The nonsense of building for hundreds of years, he said, must be exploded. It is essential today, he asserted, that our buildings be assembled with a view to change, not only internally but externally as well. "We are entering an age when the great will require. . . . These buildings of the future with steel frame, with walls, partitions and floors of light sheet metal, efficiently insulated, with surfaces, exterior and interior treated with color, the rooms supplied with conditioned air, which means washed, warmed or cooled fresh air, will provide the future man with an entire control of living conditions over the inclemency of the elements and with a far greater flexibility for his ever-changing form of life. They will be all the more suitable for his purpose because they will be built by himself for himself, not for his heirs and successors."

He charged architects with the almost unfailing tendency to clothe the steel frame of the modern structure "with stone and brick traditional forms which belong to the older but fast disappearing wall-bearing structure, with the result that we have in most countries buildings which are technically modern but artistically heavily monumental, traditional and out of date."

Art expression, he contended, never precedes but follows technical achievement. The time lag in finding a new art expression for a new technique in any people can be measured by the quickness or slowness of their reactions to new forms.

All that is really necessary in a wall, he pointed out, is that it shall be open enough to admit as much light as the room demands and strong enough to keep out the elements and prevent anyone pushing furniture into the street. "As far as we can see at the moment some form of sheet metal product will satisfy these requirements best."

He ridiculed the present tendency to dress up the sheet metal stairway of the modern steel frame structures with stone, marble, terrazzo, etc., to make it look like the "stone stair of a dead period." It makes it appear something which it is not and loads the structure unnecessarily. He termed abortive the method of making metal doors imitate wood with heavily molded architraves and applied moldings, when they might well have plain frames with the door flush and painted in distinguishing colors. Similarly, partitions should be treated along lines mentioned for doors, with cork or other insulating core to prevent sounds traveling from room to room. He suggested that sheet metal furniture is eminently satisfactory, especially when wood forms are not copied, and he referred to the development of the combined stove and refrigerator, where the insulation between the two parts has been so perfected that it points to a similar treatment of external walls and internal partitions.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel	*Base per Lb.*
F.o.b. Pittsburgh		1.80c.
F.o.b. Chicago		1.85c.
F.o.b. Gary		1.85c.
F.o.b. Duluth		1.95c.
Del'd Detroit		1.95c.
F.o.b. Cleveland		1.85c.
F.o.b. Buffalo		1.90c.
Del'd Philadelphia		2.09c.
Del'd New York		2.13c.
F.o.b. Birmingham		1.95c.
F.o.b. cars dock Gulf ports		2.20c.
F.o.b. cars dock Pacific ports		2.35c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Gary	1.75c.
F.o.b. Moline, Ill.	1.75c.
F.o.b. Cleveland	1.75c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Gulf ports	2.10c.
F.o.b. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Gary	2.10c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Youngstown	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Terre Haute, Ind.	1.75c.
F.o.b. Reading, Pa.	
F.o.b. Danville, Pa.	
F.o.b. Berwick, Pa.	

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.10c.
F.o.b. Chicago	2.15c.
F.o.b. Gary	2.15c.
F.o.b. Cleveland	2.15c.
F.o.b. Buffalo	2.20c.
Del'd Detroit	2.30c.
Del'd eastern Michigan	2.35c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts

	Base per Net Ton
F.o.b. Pittsburgh	$50.00
F.o.b. Chicago	50.00
F.o.b. Duluth	51.00
F.o.b. Cleveland	50.00
F.o.b. Birmingham	53.00
F.o.b. Houston	59.00
F.o.b. cars dock Pacific ports	67.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.985c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.985c.
Del'd New York	2.08c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.985c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.005c.
Del'd New York	2.0525c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.14c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. dock cars Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. dock cars Pacific ports	3.00c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.55c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.50c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.39c.
No. 24, f.o.b. Birmingham	3.25c.
No 24, f.o.b. dock cars Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast ports	3.25c.

Tin Plate *Base per Box*

Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate
(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	60c.
Del'd Chicago	
F.o.b. Worcester	

Fender

No. 16 and heavier, Cleveland	
F.o.b. Worcester	
No. 17 and lighter, Cleveland	
F.o.b. Worcester	

Hot-Rolled Rail Steel

	Base per L.
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

	To Manufacturing Trade Per Lb.
Bright wire	2.30c.
Spring wire	3.20c.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

	Base per Keg
Standard wire nails	$2.60
Smooth coated nails	2.60
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10
	Base per 100 Lb.
Annealed fence wire	$2.45
Galvanized fence wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind.; mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth which is $3 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On manufacturers' wire prices at Pacific ports are $9 above the Pittsburgh base. On high-carbon spring wire, prices at Pacific ports are also $9 above Pittsburgh. On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi are $6 a ton over Pittsburgh, while New Orleans and Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are $11 a ton above Pittsburgh.

Wire Hoops, Twisted or Welded

	Off List
F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

Bale Ties, Single Loop

	Base per Net Ton
F.o.b. Pittsburgh	$63.00
F.o.b. Chicago	64.00
F.o.b. Duluth	65.00
F.o.b. Cleveland	63.00
F.o.b. Birmingham	66.00
F.o.b. cars dock Houston, Galveston, Beaumont, Orange or Corpus Christi, Tex.	72.00
F.o.b. cars dock Pacific ports	74.00

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel Inches	Black	Galv.	Wrought Iron Inches	Black	Galv.
⅛	51½	29½	⅛	+91½	+138
¼ to ⅜	53½	35	¼ & ⅜	+1½	+21½
½	58½	47	½	31½	15
¾	62	52	¾	36½	20½
1 to 3	64	55	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	60	51	2	37	22½
2½ to 3	63	54	2½ to 3½	38	25
3½ to 6	65	56	4 to 8	40	28½
7 and 8	64	54	9 to 12	38	24½
9 and 10	63½	53½			
11 and 12	62½	52½			

Butt Weld, extra strong, plain ends

¼	48½	33½	⅛	+13	+45½
½ to ⅜	51	38	¼ & ⅜	+2½	+34½
½	56½	47½	½	32½	17½
¾	61	52	¾	37½	22½
1 to 3	63	55	1 to 2	43½	29

Weld, extra strong, plain ends

	58	50	2	40	26
to 3	62	54	2½ to 4	45½	33
to 6	65½	57½	4½ to 6	45	33½
8	64½	54½	7 & 8	46	33
9 and 10	63½	53½	9 to 12	41½	30
and 12	62½	52½			

Standard steel pipe an extra 5% off

...ales to consumers while two ...s off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	....
1¼ in. o.d.	13 B.W.G.	10.19	....
1½ in. o.d.	13 B.W.G.	11.26	....
1¾ in. o.d.	13 B.W.G.	12.81	....
2 in. o.d.	13 B.W.G.	14.35	$13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	21.45	19.50
3¼ in. o.d.	11 B.W.G.	25.22	22.93
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.96

Extras for less-carload quantities:
25,000 lb. or ft. to 39,999 lb. or ft. 5 %
10,000 lb. or ft. to 24,999 lb. or ft. 12½ %
2,000 lb. or ft. to 9,999 lb. or ft. 25 %
Under 2,000 lb. or ft. 40 %

Hot-Finished Lapweld Steel Pressure Tubes

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

1½ in. o.d.	13 B.W.G.	$ 9.72
1¾ in. o.d.	13 B.W.G.	11.06
2 in. o.d.	13 B.W.G.	12.38
2¼ in. o.d.	13 B.W.G.	13.79
2½ in. o.d.	12 B.W.G.	16.58
2¾ in. o.d.	12 B.W.G.	17.54
3 in. o.d.	12 B.W.G.	18.35
3¼ in. o.d.	11 B.W.G.	21.56
3½ in. o.d.	11 B.W.G.	23.15
4 in. o.d.	10 B.W.G.	28.66
4½ in. o.d.	10 B.W.G.	35.22
5 in. o.d.	9 B.W.G.	44.25
6 in. o.d.	7 B.W.G.	68.14

Quantity Extras:

40,000 lb. or ft.	base
25,000 lb. or ft. to 39,999 lb. or ft.	plus 5 %
10,000 lb. or ft. to 24,999 lb. or ft.	plus 12½ %
2,000 lb. or ft. to 9,999 lb. or ft.	plus 25 %
Under 2,000 lb. or ft.	plus 40 %

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$47.00
4-in., del'd Chicago	50.00
6-in. and larger, del'd New York	45.00
4-in. del'd New York	48.00
6-in., and larger, Birmingham	39.00
4-in. Birmingham	42.00

Class "A" and gas pipe, $3 extra

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

Base per 100 Lb.

Spikes, 9/16 in. and larger	$2.40
Spikes, ½ in. and smaller	2.40
Spikes, boat and barge	2.40
Tie plates, steel	1.90
Track bolts, to steam railroads	3.55
Track bolts, no jobbers, all sizes (per 100 count)	70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va., Jersey City, N. J.

Girder Rails

	Per Gross Ton
F.o.b. Lorain	$47.00
F.o.b. Steelton	47.00

Splice Bars for Girder Rails

	Base per 100 Lb.
F.o.b. Lorain and Steelton	$4.30

Steel Car Axles

	Base per Lb.
F.o.b. Pittsburgh	2.65c.
F.o.b. Chicago	2.65c.
F.o.b. Birmingham	2.65c.

LTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

ine bolts	70
ilage bolts	70
bolts	70
e bolts, Nos. 1, 2, 3 and 7 heads..	70
-pressed nuts, blank or tapped,	70
ngons	70
and t. square or hex. nuts, blank tapped	70
d-finished hexagon nuts	70
d-finished hexagon castellated nuts, A.E.	70
e bolts in packages, Pittsburgh..	75
e bolts in packages, Chicago....	75
e bolts in packages, Cleveland....	75
e bolts in bulk, P'gh	83
e bolts in bulk, Chicago	83
e bolts in bulk, Cleveland	83
e bolts	60

Large Rivets

(½-in. and larger)

Base per 100 Lb.

b. Pittsburgh or Cleveland	$2.90
b. Chicago	3.00
b. Birmingham	3.05

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

b. Pittsburgh	70 and 5
b. Cleveland	70 and 5
b. Chicago and Birm'g'm	70 and 5

Cap and Set Screws

ight allowed up to but not exceeding per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

ad cap screws, 1 in. dia. and maller	75, 10 and 10
ad standard set screws, case hard-ned, 1 in. dia. and smaller	75 and 10
ad headless set screws, cut thread in. and smaller	75
t hex. head cap screws, U.S.S.S. S.A.E. thread, 1 in. dia. and maller	85
t set screws, cut and oval point	75 and 10
ad studs	65

lloy and Stainless Steel

Alloy Steel Ingots

b. Pittsburgh, Chicago, Canton, illion, Buffalo, Bethlehem, ropped $40 per gross ton

Alloy Steel Blooms, Billets and Slabs

b. Pittsburgh, Chicago, Canton, illion, Buffalo, Bethlehem. ase price, $49 a gross ton. rice del'd Detroit is $52.

Alloy Steel Bars

b. Pittsburgh, Chicago, Buffalo, hlehem, Massillon or Canton, n-hearth grade, base 2.45c. overed price at Detroit is 2.60c.

	Alloy Differential per 100 lb.
bers	
(⅛% Nickel)	$0.25
(2½% Nickel)	0.55
(3½% Nickel)	1.50
(5% Nickel)	2.25
Nickel Chromium	0.55
Nickel Chromium	1.35
Nickel Chromium	3.80
Nickel Chromium	3.20
Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
Chromium Steel (0.60 to 0.90 Chromium)	0.35
Chromium Steel (0.80 to 1.10 Chromium)	0.45
Chromium Spring Steel	base
Chromium Vanadium Bar	1.20
Chromium Vanadium Spring Steel	0.95
mium Nickel Vanadium	1.50
on Vanadium	0.95

ese prices are for hot-rolled steel The differential for most grades in ric furnace steel is 50c. higher. The erential for cold-drawn bars is ½c. per higher with separate extras. Blooms, ts and slabs under 4x4 in. or equiv- are sold on the bar base. Slabs with ction area of 16 in. and 2½ in. thick ver take the billet base. Sections 4x4 to 10x10 in. or equivalent carry a ton price, which is the net price for the same analysis. Larger sizes r extras.

Alloy Cold-Finished Bars

b. Pittsburgh, Chicago, Gary, eland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C)

(Base Prices, f.o.b. Pittsburgh)

	Per Lb.
	23c.
	26c.
	32c.
rolled strip	20½c.
-rolled strip	27c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Uncropped $29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham. Uncropped $31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

Per Gross Ton

Rerolling	$27.00
Forging quality	32.00

Delivered Detroit

Rerolling	$30.00
Forging	35.00

Billets Only F.o.b. Duluth

Rerolling	$29.00
Forging	34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md. *Per Gross Ton*

Open-hearth or Bessemer $28.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved	1.70c.
Univergal	1.70c.
Sheared	1.70c.

Tube Rounds

Base per Lb.

F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c.

Wire Rods

(Common soft, base)

Per Gross Ton

F.o.b. Pittsburgh	$38.00
F.o.b. Cleveland	38.00
F.o.b. Chicago	39.00
F.o.b. Anderson, Ind.	39.00
F.o.b. Youngstown	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$19.50	$20.00	$19.00	$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	....	....	19.00	....
Sparrows Point, Md.	19.50	....	19.00	....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	19.00	17.50	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	....
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	....
Duluth, Minn.	19.00	19.00	....	19.50
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	....	17.00	..

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District From Everett, Mass.	$20.00	$20.50	$19.50	$21.00
Brooklyn From East Pa. or Buffalo	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J. From East. Pa. or Buffalo	20.89	21.39	20.39	21.89
Philadelphia From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati From Hamilton, Ohio	19.51	19.51	19.01	20.01
Canton, Ohio From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio From Hamilton, Ohio	20.50	20.50	....	....
Mansfield, Ohio From Cleveland and Toledo	20.26	20.26	....	....
Indianapolis From Hamilton, Ohio	20.77	20.77	....	....
South Bend, Ind. From Chicago	20.55	20.55	....	....
Milwaukee From Chicago	19.50	19.50	....	....
St. Paul From Duluth	20.94	....	....	....
Davenport, Iowa From Chicago	20.26	20.26	....	....
Kansas City From Granite City	21.04	21.04	....	....

Delivered prices on Southern iron for shipment to Northern destinations are 50c. a gross ton below delivered prices from the nearest Northern basing point.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. $23.50

Johnson City, Tenn.	19.50
Del'd Chicago	25.15

GRAY FORGE PIG IRON

Valley furnace	$18.25

CHARCOAL PIG IRON

Lake Superior furnace	$21.00
Delivered Chicago	24.04
Delivered Buffalo	24.28

CANADA Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.25	20.50
Malleable	21.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $85.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% $26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$22.75	12%	$29.25
7%	23.75	13%	30.75
8%	24.75	14%	32.25
9%	25.75	15%	33.75
10%	26.75	16%	35.25
11%	27.75	17%	36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$27.75	14%	$33.25
11%	28.75	15%	34.75
12%	30.25	16%	36.25
13%	31.75	17%	37.75

Manganese 1½ to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W, del., carloads	$1.40 to $1.50
Ferrotungsten, less carloads	1.55 to 1.60
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads	19.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained V	$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	$11.50 to $12.00
No. 2 heavy melting steel	10.50 to 11.00
No. 2 railroad wrought	11.50 to 12.00
Scrap rails	11.50 to 12.00
Rails 3 ft. and under	14.50 to 15.00
Compressed sheet steel	11.00 to 11.50
Hand bundled sheet steel	10.00 to 10.50
Hvy. steel axle turnings	11.00 to 11.50
Machine shop turnings	7.50 to 8.00
Short shov. turnings	7.50 to 8.00
Short mixed borings and turnings	7.00 to 7.50
Cast iron borings	7.00 to 7.50
Cast iron carwheels	11.50 to 12.00
Heavy breakable cast	10.00 to 10.50
No. 1 cast	12.00 to 12.50
Railr. knuckles and couplers	13.25 to 13.75
Rail, coil and leaf springs	13.25 to 13.75
Rolled steel wheels	13.25 to 13.75
Low phos. billet crops	15.00 to 15.50
Low phos. sheet bar crops	14.00 to 14.50
Low phos. plate scrap	13.50 to 14.00
Low phos. punchings	14.00 to 14.50
Steel car axles	14.50 to 15.00

CHICAGO

Delivered Chicago district consumers:

Per Gross Ton

Heavy melting steel	$9.00 to $9.50
Automobile hvy. melt. steel	8.50 to 9.00
Shoveling steel	9.00 to 9.50
Hydraulic comp. sheets	8.00 to 8.50
Drop forge flashings	7.00 to 7.50
No. 1 busheling	7.00 to 7.50
Rolled carwheels	10.00 to 10.50
Railroad tires	10.00 to 10.50
Railroad leaf springs	10.00 to 10.50
Axle turnings	8.00 to 8.50
Steel couplers and knuckles	10.00 to 10.50
Coil springs	10.50 to 11.00
Axle turnings (elec. fur.)	8.50 to 9.00
Low phos. punchings	10.00 to 10.50
Low phos. plates, 12 in. and under	10.50 to 11.00
Cast iron borings	5.00 to 5.50
Short shoveling turnings	5.00 to 5.50
Machine shop turnings	4.75 to 5.25
Rerolling rails	10.00 to 10.50
Steel rails, less than 3 ft.	10.00 to 10.50
Steel rails, less than 2 ft.	10.50 to 11.00
Angle bars, steel	10.00 to 10.50
Cast iron carwheels	9.50 to 10.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	7.75 to 8.25

Per Net Ton

Iron car axles	$12.00 to 12.50
Steel car axles	10.25 to 10.75
No. 1 railroad wrought	7.50 to 8.00
No. 2 railroad wrought	8.00 to 8.50
No. 2 busheling	3.50 to 4.00
Locomotive tires, smooth	9.00 to 9.50
Pipe and flues	4.50 to 5.00
No. 1 machinery cast	8.00 to 8.50
Clean automobile cast	8.00 to 8.50
No. 1 railroad cast	7.50 to 8.00
No. 1 agricultural cast	7.00 to 7.50
Stove plate	5.25 to 5.75
Grate bars	4.75 to 5.25
Brake shoes	6.00 to 6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	$10.00
No. 2 heavy melting steel	8.50
No. 1 railroad wrought	$11.00 to 11.50
Bundled sheets	9.50
Hydraulic compressed, new	10.00
Hydraulic, compressed, old	6.50 to 7.00
Machine shop turnings	6.00
Heavy axle turnings	9.00 to 9.50
Cast borings	5.50 to 6.00
Heavy breakable cast	10.00 to 10.50
Stove plate (steel works)	8.00 to 8.50
No. 1 low phos. heavy	14.00 to 14.50
Couplers and knuckles	13.50 to 14.00
Rolled steel wheels	13.50 to 14.00
No. 1 blast furnace	5.50 to 6.00
Spec. iron and steel pipe	8.00
Shafting	15.00 to 16.00
Steel axles	14.50
No. 1 forge fire	9.50
Cast iron car wheels	11.00 to 11.50
No. 1 cast	11.50 to 12.00
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	$7.25 to $7.75
Scrap rails for melting	8.25 to 8.75
Loose sheet clippings	3.75 to 4.25
Bundled sheets	5.75 to 6.25
Cast iron borings	5.00 to 5.50
Machine shop turnings	4.75 to 5.25
No. 1 busheling	6.25 to 6.75
No. 2 busheling	2.75 to 3.25
Rails for rolling	8.75 to 9.25
No. 1 locomotive tires	8.50 to 9.00
Short rails	11.25 to 11.75
Cast iron carwheels	7.75 to 8.25
No. 1 machinery cast	9.00 to 9.50
No. 1 railroad cast	8.50 to 9.00
Burnt cast	6.00 to 6.50
Stove plate	6.00 to 6.50
Agricultural malleable	8.00 to 8.50
Railroad malleable	8.00 to 8.50

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	$9.00 to $9.50
No. 2 heavy melting steel	8.50 to 9.00
Compressed sheet steel	8.50 to 9.00
Light bundled sheet stampings	7.25 to 7.50
Drop forge flashings	8.00 to 8.50
Machine shop turnings	6.50 to 7.00
Short shoveling turnings	7.00 to 7.50
No. 1 busheling	8.00 to 8.50
Steel axle turnings	7.50 to 8.00
Low phos. billet crops	13.25 to 13.75
Cast iron borings	6.75 to 7.25
Mixed borings and short turnings	6.75 to 7.25
No. 2 busheling	6.75 to 7.25
No. 1 cast	11.50 to 11.75
Railroad grate bars	7.00 to 7.50
Stove plate	6.50 to 7.00
Rails under 3 ft.	14.00 to 14.50
Rails for rolling	15.50 to 18.00
Railroad malleable	11.50 to 12.00
Cast iron carwheels	10.75 to 11.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting scrap	8.50 to 9.00
Scrap rails	9.50 to 10.00
New hydraul. comp. sheets	8.50 to 9.00
Old hydraul. comp. sheets	7.50 to 8.00
Drop forge flashings	8.50 to 9.00
No. 1 busheling	8.50 to 9.00
Hvy. steel axle turnings	6.50 to 7.00
Machine shop turnings	5.00 to 5.50
Knuckles and couplers	11.00 to 11.50
Coil and leaf springs	11.00 to 11.50
Rolled steel wheels	11.00 to 11.50
Low phos. billet crops	11.50 to 12.00
Short shov. steel turnings	5.50 to 6.00
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
No. 2 busheling	5.50 to 6.00
Steel car axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 machinery cast	10.00 to 10.50
No. 1 cupola cast	8.00 to 8.50
Stove plate	8.50 to 8.75
Steel rails, 3 ft. and under	12.00 to 12.50
Cast iron carwheels	10.00 to 10.50
Industrial malleable	10.00 to 10.50
Railroad malleable	10.00 to 10.50
Chemical borings	7.00 to 7.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	$5.75 to $6.25
Scrap T rails	5.75 to 6.25
No. 2 steel	5.00 to 5.25
Breakable cast	6.00 to 6.50
Machine shop turnings	1.80 to 2.05
Bundled skeleton, long	4.25 to 4.50
Forge flashings	4.25 to 4.50
Blast furnace scrap	2.00 to 2.50
Shafting	11.00 to 11.25
Steel car axles	10.50 to 11.00
Cast iron borings, chemical	8.25 to 8.50
Stove plate	6.50
Per gross ton delivered consumers' yards:	
Textile cast	$7.50 to $9.00
No. 1 machinery cast	7.50 to 9.00
Railroad malleable	11.00 to 11.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	*$7.00 †$8.00
No. 2 heavy melting steel	*5.50 to †6.50
Heavy breakable cast	6.50 to 7.00
No. 1 machinery cast	7.50 to 8.00
No. 2 cast	6.25 to 6.75
Stove plate	5.00 to 5.50
Steel car axles	10.75 to 11.50
No. 1 railroad wrought	7.50 to 8.00
No. 1 yard wrought, long	6.50 to 7.00
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rerolling	8.00 to 9.00
Short shoveling turnings	2.50 to 3.00
Machine shop turnings	2.50 to 3.00
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	3.00 to 4.00
Per gross ton, delivered local foundries:	
No. machinery cast	$10.75
No. 1 hvy. cast (cupola size)	9.75
No. 2 cast	8.25

*For direct car loading only.
†Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	$10.00
Scrap steel rails	9.00
Short shoveling turnings	5.50
Stove plates	$7.00 to 7.50
Steel axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 railroad wrought	7.00
Rails for rolling	10.50
No. 1 cast	9.00 to 9.50
Tramcar wheels	9.00 to 9.50
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	$8.75 to $9.25
No. 1 heavy melting	8.50 to 9.00
No. 2 heavy melting	6.50 to 7.00
No. 1 locomotive tires	9.50 to 10.00
Misc. stand-sec. rails	8.75 to 9.25
Railroad springs	9.50 to 10.00
Bundled sheets	6.75 to 7.25
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	4.75 to 5.25
Rails for rolling	9.75 to 10.25
Machine shop turnings	4.50 to 5.00
Heavy turnings	5.50 to 6.00
Steel car axles	10.50 to 11.00
Iron car axles	12.50 to 13.00
No. 1 railroad wrought	5.50 to 6.00
Steel rails less than 3 ft.	10.75 to 11.25
Steel angle bars	9.00 to 9.50
Cast iron carwheels	8.00 to 8.50
No. 1 machinery cast	9.00 to 9.50
Railroad malleable	8.50 to 9.00
No. 1 railroad cast	8.50 to 9.00
Stove plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	$7.00 to $7.50
Borings and short turnings	5.00 to 5.50
Long turnings	$4.00 to
No. 1 machinery cast	9.00 to
Automotive cast	10.00 to
Hydraul. comp. sheets	7.00 to
Stove plate	6.50 to
New factory busheling	6.00 to
Old No. 2 busheling	4.25 to
Sheet clippings	3.50 to
Flashings	6.00 to
Low phos. plate scrap	7.50 to

CANADA

Dealers' buying prices per gross ton:

	Toronto
Heavy melting steel	$5.50
Rails scrap	6.00
Machine shop turnings	2.50
Boiler plate	4.50
Heavy axle turnings	2.50
Cast borings	3.00
Steel borings	2.00
Wrought pipe	2.50
Steel axles	4.50
Axles wrought iron	4.50
No. 1 machinery cast	7.75
Stove plate	4.50
Standard carwheels	7.25
Malleable	6.75

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.5% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 68½% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c
Manganese, Caucasian, washed 52%	24c
Manganese, African, Indian, 44-48%	21c.
Manganese, African, Indian, 49-51%	24c.
Manganese, Brazilian, 46 to 48½	20c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered*	$18.00 to $18.75
Tungsten, domestic scheelite, delivered†	17.00

Per Gross Ton

Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	$17.00
Chrome, 48% Cr_2O_3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.
†Nominal; no supplies available.

Fluorspar

Per Net Ton

Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	$15.50 to $16.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	$15.50 to 16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville Prompt	$3.85
Foundry, f.o.b. Connellsville Prompt	$4.60 to 5.10
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	11.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00
Foundry, by-product, Cleveland, delivered	
Foundry, Birmingham	
Foundry, by-product, St. Louis, f.o.b. ovens	
Foundry, by-product, del'd St. Louis	

Coal

Per Net

Mine run steam coal, f.o.b. W. Pa. mines	$1.80 to
Mine run coking coal f.o.b. W. Pa.	2.05 to
Gas coal, ¾-in. f.o.b. Pa. mines	2.25 to
Mine run gas coal, f.o.b. Pa. mines	2.05 to
Steam slack, f.o.b. W. Pa. mines	1.55 to
Gas slack, f.o.b. W. Pa. mines	1.90 to

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.

No. 3 distillate	
No. 4 industrial	

Per Gal. f.o.b. Baltimore

No. 3 distillate	
No. 4 industrial	

Per Gal. del'd Chicago

No. 3 industrial fuel oil	
No. 5 industrial fuel oil	

Per Gal. f.o.b. Cleveland

No. 3 distillate	
No. 4 industrial	
No. 5 industrial	

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b.

	High-heat	Intermediate Duty Brick	Duty
Pennsylvania	$45.00		
Maryland	45.00		
New Jersey	55.00		
Ohio	45.00		
Kentucky	45.00		
Missouri	45.00		
Illinois	45.00		

Ground fire clay, per ton 7.00

Chrome Brick

Per

Standard size

Silica Brick

Per 1000 f.o.b.

Pennsylvania	
Chicago	
Birmingham	
Silica clay, per ton	

Magnesite Brick

Per

Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	
Unburned, f.o.b. Baltimore	
Imported grain magnesite, f.o.b. Baltimore and Chester, Pa.	
Domestic grain magnesite, f.o.b. Baltimore and Chester, Pa.	
Domestic, f.o.b. Chewelah, Wash.	

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock—	
Rounds and hexagons	*3.45c.
Squares and flats	*3.45c.
Hoops and bands under ¼ in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count,	65 per cent off list.
Machine bolts, 100 count,	65 per cent off list.
Carriage bolts, 100 counts,	65 per cent off list.
Nuts, all styles, 100 count,	65 per cent off list.
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb.	*2.70c.
Wire, galv. soft, base per 100 lb.	*2.925c.
Common wire nails, per keg	*2.834c.
Cement coated nails, per keg	*2.834c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (9/16 in. and lighter)	3.50c.
Track bolts	4.65c.
Rivets, structural (keg lots)	3.50c.
Rivets, boiler (keg lots)	3.60c.
	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex. tap or blank	60 and 5
Hex. head and cap screws	80
Cup point set screws	70 and 10
Flat head bright wood screws	37½ and 10
Spring cotters	50
Stove bolts in full packages	70 and 10
Bd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	3.05c.
Cement c't'd nails, base per keg	3.05c.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.22c.
Iron bars	3.22c.
Iron bars, swed. charcoal	6.50 to 7.25c.
Cold-fin. shafting and screw stock;	
Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter hard	3.32c.
Hoops	3.52c.
Bands	3.52c.
Hot-rolled sheets (No. 10)	3.27c.
Hot-rolled ann'l'd sheets (No. 24*)	3.85c.
Galvanized sheets (No. 24*)	4.50c.
Long terne sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.25c.
Wire, galv. (No. 10)	3.85c.
Tire steel, 1 x ½ in. and larger	3.65c.
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.21
	Per Cent Off List
Machine bolts, cut thread:	
Up to 1 in. dia. inclusive	60
Over 1 in. dia.	50
Carriage bolts, cut thread:	
Up to ½ in. dia. inclusive	60
Over ½ in. dia.	50
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.44c.
Bars, soft steel or iron	3.19c.
Cold-fin. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	4.14c.
Galv. sheets (No. 24)	4.79c.
Hot-rolled sheets (No. 10)	3.29c.
Black corrug. sheets (No. 24)	4.14c.
*Galv. corrug. sheets	4.79c.
Structural rivets	3.84c.
Boiler rivets	3.94c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	
1000 lb. or over	60
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.95c.
*Structural shapes	2.95c.
*Soft steel bars, small shapes, iron bars (except bands)	2.90c.
‡Reinforc. steel bars, sq. twisted and deformed	2.955c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.40c.
*Steel bands, No. 12 and 3/16 in., incl.	3.15c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.55c.
†Galvanized sheets (No. 24)	4.25c.
*Hot-rolled annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, ¼ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.
†For 50 bundles or over.
‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	2.95c.
Reinforc. steel bars	*2.10c.
Cold-finished steel bars	3.40c.
Flat-rolled steel under ¼ in.	3.36c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
Black ann'l'd wire, per 100 lb.	$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

*Plus mill, size and quantity extras.
†Outside delivery 10c. less.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.45c.
Bars, soft steel or iron	3.25c.
New billet reinforc. bars	3.10c.
Rail steel reinforc. bars	3.10c
Hoops and bands, 3/16 in. and lighter	3.60c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.85c.
Hot-rolled sheets (No. 10)	3.35c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg.	2.95
Chain, 1-in., per 100 lb.	6.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$17.89
4-in.	41.69
Lap-welded steel boiler tubes, 2-in.	16.61
4-in.	38.72

BUFFALO

	Base per Lb.
Plates	3.40c.
Struc. shapes	3.30c.
Soft steel bars	3.10c
Reinforcing bars	2.10c.
Cold-fin. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.67c
Galv. sheets (No. 24)	4.65c
Bands	3.57c
Hoops	3.57c
Hot-rolled unannealed sheets	3.32c
Com. wire nails, base per keg	$3.00
Black wire, base per 100 lb.	3.45c

BOSTON

	Per Lb
Beams, channels, angles, tees, zees	3.42c
H beams and shapes	3.42c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.43c.
Floor plates, diamond pattern	5.18c.
Bar and bar shapes (mild steel)	3.25c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.50c. to 4.50c.
Half rounds, half ovals, ovals and bevels	4.50c.
Tire steel	4.50c.
Cold-finished rounds and hexagons	3.70c.
Cold-rolled strip steel	5.20c
Cold-finished squares and flats	4.20c.
Blue annealed sheets, No. 10 ga.	3.25c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Galvanized steel sheets, No. 24 ga.	4.60c
Lead coated sheets, No. 24 ga.	5.65c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST

	Base per Lib.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.55c.	3.70c.	3.55c
Shapes, standard	3.55c.	3.70c.	3.55c.
Soft steel bars	3.60c.	3.70c.	3.55c.
Reinforcing bars	3.50c.	3.50c.	3.50c.
Hot-rolled annealed sheets (No. 24)	4.40c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.75c.	3.80c.	3.75c.
Galv. sheets (No. 24)	5.00c.	5.05c.	5.00c.
Cold finished steel Rounds	5.95c.	5.95c.	4.75c.
Squares and hexagons	7.20c.	7.20c.	6.00c.
Flats	7.70c.	7.70c.	7.00c.
Common wire nails—base per keg less carload	$3.40	$3.25	$3.35

All items subject to differentials for quantity.

Minor Price Changes Made

NEW prices of 1.80c. a lb., Cleveland, on merchant axle steel bars and of 1.95c. a lb., Cleveland, on axle steel concrete reinforcing bars go into effect on Aug. 10. A price of 6½c. a lb., Syracuse, on tool steel (open-hearth chrome magnet steel, chrome 2.50 to 4 per cent) also is effective Aug. 10.

A price of 39c. a lb., Pittsburgh, on stainless steel plates (type No. 329, C 0.10 per cent max., Cr 25 to 30 per cent, Ni 3 to 5 per cent and Mo 1 to 1.50 per cent) is effective Aug. 11.

A price of 11.80c. a lb., Worcester, Mass., on bright, untempered valve spring wire, went into effect Aug. 3. Swedish oil-tempered spring wire was quoted at 11.25c. a lb., Worcester, beginning Aug. 3.

No. 16 gage galvanized corrugated, copper steel, culvert sheets (regular coating) will be quoted at 2.90c. a lb., Gary, effective Aug. 12.

All Metals Continue Inactive As Consuming Operations Slacken

Spelter Sales Total About 2200 Tons, Mostly Prompt at 4.30c.; Lead Bookings Decline—Copper and Tin Very Quiet

NEW YORK, Aug. 7.—The copper code authority has announced that holders of copper stocks may now participate in sales under certain conditions. This will probably enable some speculative holdings to be liquidated, although the owners may encounter difficulty in finding buyers. At present there is very little new copper being sold, and the market continues in a very listless condition. However, most sellers report good deliveries on contract tonnages, thereby indicating that consuming industries are still fairly active. Nevertheless it will probably be more than a month before fabricators will return to the market for any volume of metal. The situation abroad is increasingly discouraging. If Germany were to return as a more substantial buyer the market might develop more stability, but such action is doubtful as the economic dictator of the Third Reich has now rationed metal purchases for all industries. The steady pressure of metal from American and other sources into a quiet European market has inevitably depressed values and British warehouse stocks are slowly mounting. The market abroad was this morning quoted at about 7.30c. a lb., c.i.f. usual Continental base ports.

Tin

This market is still marked by a complete absence of consuming demand. During the week English prices declined an average of almost £4, and Straits tin at New York dropped 35 to 40 points to today's level of 51.75c. a lb. A few prompt orders were attracted by the lower price level, but there was no inquiry for forward positions. Perhaps industrial buyers here expect lower levels to be reached, although no pronounced weakness is expected abroad so long as the buffer pool purchases offerings to support the market. There is a possibility, however, that the pool will not be able to support prices much longer, as there is yet no danger of a shortage of metal and the full effect of recent increases in production quotas has yet to make itself apparent. The world's visible tin stocks dropped 938 tons in July, and United States stocks now stand at about 6461 tons, of which 2135 tons are in warehouses and the remainder is afloat or landing.

Zinc

Total weekly bookings are still quite low, in keeping with the general slackening of activity in spelter-consuming industries. Leading sellers disposed of about 2200 tons last week at 4.30c. a lb., as compared with 2000 tons in each of the two preceding weekly periods. Although most users are limiting their purchases to routine demands, it is estimated that the industry is somewhat underbought. This fact, coupled with prospective higher prices for concentrates, is being reflected in steadier Prime Western prices. The market is still unchanged at 4.65c. a lb., New York, and 4.30c., East St. Louis, and it is doubtful whether these prices will be shaded to any great extent even though several sellers are desirous of business. In the Joplin area production of ore was advanced to 6500 tons last week, sales rose to 5730 tons and shipments of 5876 tons were reported. Stocks now stand at the comparatively low level of 12,460 tons, and the price is unchanged and steady at $27 and $28 a ton respectively for flotation and prime grades of concentrates.

Lead

Consumer demand has dwindled to occasional carlots, which aggregate less than the average daily ore intakes of leading smelters. The present demand is mostly for September delivery, for which month about 8000 tons have already been booked. One large seller is still quoting five points above the market on competitive business, which would seem to indicate that it is satisfied with the tonnage secured in July and has no desire to contract in a large way through September at the current low price level. The trade is seemingly unconcerned with present inactivity, since well over 31,000 tons of metal will be shipped in August. However, it is quite possible that a large proportion of these shipments will not go into immediate consumption, and as a consequence the demand for the next two months may not come up to expectations. Consequently the price will probably not show much strength during that period.

The Week's Prices. Cents Per Pound for Early Delivery

	Aug. 1	Aug. 2	Aug. 3	Aug. 4	Aug. 6	Aug. 7
Electrolytic copper, N. Y.*‡	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, Eastern delivery*	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, N. Y.	51.75	51.65	51.75	....	51.75	51.75
Zinc, East St. Louis	4.30	4.30	4.30	4.30	4.30	4.30
Zinc, New York	4.65	4.65	4.65	4.65	4.65	4.65
Lead, St. Louis	3.60	3.60	3.60	3.60	3.60	3.60
Lead, New York	3.75	3.75	3.75	3.75	3.75	3.75

*Blue Eagle copper. ‡Refinery price ¼c. higher in Connecticut Valley.

Quotations below cover wholesale lots, f.o.b. New York.

Aluminum, 98-99 per cent, 22.90c. a lb.
Aluminum, remelt, No. 12 (grade 3), 12.75c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb.; shot and ingot, remelt electro, 36c. a lb.
Antimony, 8.12½c. a lb. Quicksilver, per flask of 76 lb., $75.
Brass ingots, 95-5-5-5, 8.75c. a lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	53.25c. to 54.25c.
Tin, bar	55.25c. to 56.25c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.50c.
*Seamless brass tubes	17.00c.
*Seamless copper tubes	17.25c.
*Brass rods	13.00c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.50c. to 5.50c.
Lead, bar	5.50c. to 6.50c.
Lead, sheets	7.50c.
Antimony, Asiatic	9.75c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	32.50c. to 33.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.25c.
Tin, bar	57.25c.
Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	4.75c. to 5.00c.
Lead, bar	7.75c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	59.25c.
Solder, ½ and ½	33.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.25c.	7.00c.
Copper, hvy. and wire	6.00c.	6.75c.
Copper, light and bottoms	5.00c.	5.87½c.
Brass, heavy	3.25c.	3.87½c.
Brass, light	2.87½c.	3.50c.
Hvy. machine composition	4.75c.	5.25c.
No. 1 yel. brass turnings	4.37½c.	5.12½c.
No. 1 red brass or compos. turnings	4.25c.	5.25c.
Lead, heavy	2.87½c.	3.37½c.
Zinc	2.25c.	3.00c.
Cast aluminum	9.62½c.	10.75c.
Sheet aluminum	11.00c.	12.50c.

World's Largest Tapered Roller Bearings

THE four largest tapered roller bearings in the world are included in the complete bearing equipment which British Timken, Ltd., is supplying for the new steel rolling mill which is being erected at the Renault automobile works in France. Each of these bearings is 4 ft. 3 in. in diameter and weighs over 3½ tons. The complete equipment also includes 64 similar bearings of various sizes.

The size of the larger bearings necessitated special manufacturing methods and specially designed equipment in some stages of production. The shaping of the inner cones on a Richard's boring mill involved the removal of approximately 392 lb. of steel from each cone. The operation occupied about 47 hr. for each cone before the correct tapered shape was obtained, with sufficient metal left for the subsequent grinding operations.

Heat treatment was applied in gas-fired furnaces. Quenching between the heat treatment stages, and also at the end, was carried out in a water-cooled oil bath over which special lifting tackle was erected. Special jigs were also designed to retain the shape of the components during quenching operations. On test the degree of eccentricity in a completely assembled bearing was found to be no more than eight ten-thousandths of an inch, which for all practical purposes is negligible in so large a bearing. The bearings were manufactured in Birmingham.

Financial Notes

CLARK EQUIPMENT CO., for the quarter ended June 30, reports net income of $97,972 against net loss of $11,892 in the corresponding period of 1933. For the first six months of 1934 the company reports net income of $216,532 against a net loss of $148,-551 for the first half of last year.

* * *

MAYTAG CO. reports net income of $586,192 for the second quarter of 1934. This is to be compared with net income of $171,376 in the like period of 1933. Current assets of June 30 last were $7,397,317, including $5,338,-129 cash and marketable securities. A year earlier current assets were $4,-980,827 including cash and marketable securities of $3,682,868.

* * *

DEERE & CO. has declared a dividend of 10c. a share on the cumulative preferred stock. This is double the rate that has been paid for the last year and a half. The regular quarterly rate of 35 cents a share was discontinued on June 1, 1932.

* * *

INLAND STEEL CO. and subsidiaries report net profit for the second quarter of $2,129,197.65. This is after deduction of bond interest and depreciation aggregating $1,312,-016.55.

* * *

CRUCIBLE STEEL CO. OF AMERICA and subsidiaries in the first half showed net profit $712,034, after deductions, equivalent to $2.85 a share on 7 per cent preferred stock. The company reported net loss of $1,024,772 in the first half last year.

* * *

BLAW-KNOX CO. and subsidiaries in the first half reported net income of $105,214, after deductions, equivalent to 8c. a share on stock outstanding. The company sustained net loss of $102,075 in the first half last year.

A NET profit of $315,727 for the half-year period ended June 30, 1934, has been reported by the United States Pipe & Foundry Co., Burlington, N. J. The total earnings for the six months were $662,716 excluding $25,950 in dividends on preferred stock owned by the company and after deducting all operating, maintenance and sales expense.

* * *

A NET profit of $2,066,755 for the half-year period ended June 30, 1934, has been reported by the National Lead Co., 111 Broadway, New York. The total gross income for the period was $7,254,528, and administration, selling and tax outlays came to $4,532,259.

SERVICE *the* WYCKOFF *way*

WYCKOFF is second to none from a standpoint of equipment, facilities and organization, no other manufacturer of cold drawn steels is in a better position to render a more COMPLETE steel service.

Every large industrial community throughout the country is served by a WYCKOFF district representative thoroughly familiar with the many and varied uses of cold drawn steels. Their services as well as those of our plant metallurgists are always available to you in solving difficult machining or other technical problems that arise in the fabrication of cold finished steels. Let us serve you.

WYCKOFF DRAWN STEEL COMPANY

General Offices: Ambridge, Pa.
Mills at Ambridge, Pa. and Chicago, Ill.
Manufacturers of
Cold Drawn Steels
Turned and Polished Shafting Turned and Ground Shafting

Iron and Steel Exports and Imports Lower in June

Imports of Iron and Steel Products into the United States

(In Gross Tons)

	June		Six Months Ended June	
	1934	1933	1934	1933
Pig iron	5,168	11,230	65,386	62,793
Sponge iron	258	105	690	220
Ferromanganese and spiegeleisen*	3,761	6,911	17,057	19,226
Ferrochrome†	....	....	34	21
Ferrosilicon‡	298	47	531	51
Other ferroalloys	13	101	46	102
Scrap	3,454	4,058	27,202	9,518
Pig iron, ferroalloys and scrap	*12,952*	*22,452*	*110,946*	*91,931*
Steel ingots, blooms, etc	268	242	663	351
Wire rods	1,377	1,431	6,732	6,065
Semi-finished steel	*1,645*	*1,673*	*7,395*	*6,416*
Concrete reinforcement bars	65	313	482	1,585
Hollow steel bars	75	90	381	476
Merchant steel bars	1,881	1,844	9,196	8,876
Iron slabs	....	....	1	1
Iron bars	51	46	346	195
Boiler and other plate	10	2	81	111
Sheets, skelp, and saw plate	132	626	2,185	5,176
Tin plate	36	6	91	188
Structural shapes	2,174	3,329	10,255	12,800
Rails and rail fastenings	527	110	1,626	816
Welded pipe	277	253	1,023	1,675
Other pipe	143	176	1,767	680
Barbed wire	880	368	5,408	4,885
Round iron and steel wire	228	169	1,358	1,298
Flat wire and strip steel	125	102	703	431
Wire rope and strand	120	125	707	767
Other wire	163	105	386	878
Hoops and bands	1,669	1,982	7,578	8,417
Nails, tacks and staples	873	375	3,503	3,368
Bolts, nuts, and rivets	12	16	166	139
Other finished steel	732	19	1,342	271
Rolled and finished steel	*10,173*	*10,056*	*48,585*	*53,033*
Cast iron pipe and fittings	....	71	7	386
Castings and forgings	88	116	705	494
Total	24,858	34,368	167,638	152,260

*Manganese content only.
†Chromium content only.
‡Silicon content only.

Exports of Iron and Steel from the United States

(In Gross Tons)

	June		Six Months Ended June	
	1934	1933	1934	1933
Pig iron	266	94	1,892	1,185
Ferromanganese	2	4	16	5
Scrap	143,115	64,852	738,848	346,420
Pig iron, ferroalloys and scrap	*143,383*	*64,950*	*740,756*	*347,610*
Ingots, blooms, billets, sheet bars	4,025	89	8,637	755
Skelp	3,976	2,570	40,785	4,662
Wire rods	2,539	1,312	15,798	6,226
Semi-finished steel	*10,540*	*3,971*	*65,220*	*11,643*
Steel bars	2,670	2,066	21,710	8,873
Alloy steel bars	124	68	1,709	610
Iron bars	46	43	554	204
Plates, iron and steel	3,780	494	17,657	2,684
Sheets, galvanized steel	4,866	3,278	30,766	14,968
Sheets, galvanized iron	80	128	773	404
Sheets, black steel	9,556	1,876	42,691	12,533
Sheets, black iron	294	206	1,846	844
Hoops, bands, strip steel	2,944	2,134	16,608	8,594
Tin plate, terne plate	10,206	5,651	97,137	24,073
Structural shapes, plain material	2,066	819	14,289	3,680
Structural material, fabricated	1,409	1,397	9,109	6,584
Tanks, steel	301	329	3,726	1,056
Steel rails	1,865	524	42,754	6,702
Rail fastenings, switches, spikes, etc	541	304	10,617	1,292
Boiler tubes	655	236	3,393	1,898
Casing and oil line pipe	5,968	1,947	34,483	15,117
Pipe, black and galvanized, welded steel	3,242	2,641	22,659	11,775
Pipe, black and galvanized, welded iron	157	234	1,155	668
Plain wire	3,249	1,673	18,667	4,590
Barbed wire and woven wire fencing	3,815	2,822	19,335	11,046
Wire cloth and screening	82	76	399	296
Wire rope	240	157	1,439	831
Wire nails	1,578	1,141	7,573	3,802
Other nails and tacks	479	402	2,641	1,797
Horseshoes	6	22	58	54
Bolts, nuts, rivets and washers, except track	436	263	2,440	1,547
Other finished steel	770	351	3,359	1,733
Rolled and finished steel	*61,425*	*31,282*	*429,547*	*148,255*
Cast iron pipe and fittings	2,421	1,546	7,395	4,193
Malleable iron screwed fittings	224	159	1,480	930
Carwheels and axles	343	285	1,847	2,191
Iron castings	512	167	3,915	1,074
Steel castings	193	41	1,002	312
Forgings	365	149	2,012	1,511
Castings and forgings	*4,058*	*2,347*	*17,651*	*10,211*
Total	219,406	102,550	1,253,174	517,719

BOTH exports and imports were smaller in June than in the previous month. Exports, however, were more than twice as large as in June, 1933. Imports showed a decline as compared with the corresponding month of last year.

Decreases in imports as compared with May included: scrap, 3521 tons; pig iron, 3460 tons; and barbed wire, 453 tons. While there were gains in 19 products as against declines in 13, the increases were small.

Pig iron was the leading product imported. Of a total of 5168 tons brought in during the month, British India supplied 2711 tons and the Netherlands, 1342 tons.

Chile again supplied the lion's share of the iron ore delivered from foreign ports, shipping 108,950 tons out of a total of 188,214 tons. Of the 15,505 tons of manganese concentrates imported, Soviet Russia supplied 5716 tons, Brazil 4673 tons and the Gold Coast 5089 tons.

Distribution of exports and imports by classes and origins is shown in the tables.

Sources of American Imports of Iron and Manganese Ores

(In Gross Tons)

	June		
	Iron Ore		Manganese Ore
	1934	1933	1934
Canada	7,186	....	27
Cuba	33,000	22,000	....
Chile	108,950	....	....
Spain	....	409	....
Norway	7,758	....	....
Sweden	....	....	....
French Africa	11,550	....	....
Russia	7,300	9,200	5,716
India	....	....	....
Brazil	....	....	4,673
West Africa	....	....	5,089
Other countries	12,470	7,803	....
Total	188,214	39,412	15,505

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	June		Six Months Ended June	
	1934	1933	1934	1933
United Kingdom	....	....	150	5,000
British India	2,711	5,047	17,728	28,768
Germany	....	....	....	234
Netherlands	1,342	5,969	40,666	23,386
Canada	729	112	4,664	956
France	....	....	....	....
Belgium	....	....	50	....
Norway	169	102	962	102
Sweden	40	....	265	2,803
All others	177	....	901	1,628
Total	5,168	11,230	65,386	62,827

Cleveland Court Decision Speeds Housing Program

WASHINGTON, Aug. 7.—The administration proposes to proceed speedily with its nation-wide program of slum clearance now that the Government's right to acquire land for this purpose and for low-cost housing was upheld by a recent decision of the United States District Court of Ohio at Cleveland. The housing project is one of the divisions of the Public Works Administration which has allotted it $125,000,000 to engage in its program under Col. Horatio B. Hackett. The Cleveland project is one of more than 30 housing projects under consideration. The division is nearly ready to start demolition on the university project in Atlanta. The first project, that at Alta Vista, Va., has been completed.

Progress Reported On Golden Gate Bridge

CLOSE to 1200 men were employed in the San Francisco bay district on work directly pertaining to the Golden Gate Bridge project during the past week, according to the report of Chief Engineer Joseph B. Strauss, filed July 29, with General Manager James Reed of the Golden Gate Bridge and Highway District for transmission to the board of directors.

Of these approximately 200 were working on the south pier fender structure and the Presidio approach structure, all structural work on the Marin side having been completed as far as possible at this stage of construction.

But four more fender units remain to be put in to complete the concrete base of the fender structure for the south pier. To date two units have been concreted to their final elevation of 15 ft. above sea level; 14 units have been concreted to a point 40 ft. below sea level and one to a point 60 ft. below sea level.

The steel working trestle now extends over 17 units, a distance of 486 ft. More than 36,684 cu. yd. of concrete have been poured on the fender structure, representing a weight of more than 73,000 tons.

In the eastern shops the tower saddles are being machined, while at the plant of the John A. Roeblings Sons Company, 7820 tons of cable wire, or 36.4 per cent of the total amount, has been completed. Miscellaneous cable fittings are in process of fabrication.

WASHINGTON, Aug. 3.—The Bureau of Supplies and Accounts, Navy Department, will open bids Aug. 21 for 582 tons of shapes for delivery at various navy yards.

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British Pig Iron Producers Curtail; Finished Steel Demand Sustained

LONDON, ENGLAND, Aug. 7 (*By Cable*).—British iron and steel markets have been influenced by the holidays, but less so than in previous years. Many pig iron makers have curtailed operations. New business is quiet, but substantial replacement orders are confidently expected by the end of the month. Prices may advance in view of increasing costs of ore and fuel.

The domestic building and motor trades are taking large quantities of finished steel and overseas demand is good, particularly from China, Russia and Argentine, mainly for rails.

Tin plate prices are firm, with good domestic and export inquiry and fair business. Production is at 60 per cent capacity and may rise to 70 per cent.

Continental iron and steel markets are also affected by the holidays. Russia has bought 20,000 tons of steel products, mainly billets and plates. The Near East, South Africa and South America are the most active export markets.

British and Continental prices are unchanged.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9
Billets, open-hrth.	£5 10s. to £5 15s.
Tin plate, per base box	18s. to 18s. 3d.
Steel bars, open-hearth	£7 17½s.
Beams, open-hrth.	£7 7½s.
Channels, open-hearth	£7 12½s.
Angles, open-hearth	£7 7½s.
Black sheets, No. 24 gage	£9 5s.
Galvanized sheets, No. 24 gage	£11 5s.

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2 7s.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel bars, merchant	£3 5s.
Sheet bars	£2 8s.
Plates, ¼ in. and up	£4
Plates, 3/16 in. and 5 mm.	£4 2s. 6d.
Sheets, ⅛ in.	£4 7s. 6d.
Beams, Thomas	£3 2s. 6d.
Angles (Basic)	£3 2s. 6d.
Hoops and strip base	£4 2s. 6d.
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

Udylite Process Co., Detroit, has changed its address from 3939 Bellevue Avenue to 1651 East Grand Boulevard.

Harold E. Trent Co., manufacturer of electric heating units and electric furnaces, Philadelphia, has opened an office at 143 Liberty Street, New York, in charge of A. H. Gurtner.

Fabricated Structural Steel

Awards Again Decline—New Projects in Lower Volume

LETTINGS of 8800 tons compare with 11,150 tons last week and 15,150 tons two weeks ago. With the exception of 2300 tons for a high school in Bayside, Long Island, awards were all less than 1000 tons. New projects of 7600 tons compare with 9250 tons in the previous week. The only new job of size is 3000 tons for a sheet metal shop for the Norfolk Navy Yard. A filtration plant at Hammond, Ind., will require 1500 tons of sheet piling. Structural steel contracts in July, at 46,500 tons, were the lowest for any month this year and compare with 82,725 tons in June and 87,350 tons in May. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Howland-Enfield, Me., 750 tons, State bridge, to Lackawanna Steel Construction Corpn.

Revere, Mass., 150 tons, buildings for Tidewater Oil Co., to Boston Bridge Works.

Southboro, Mass., 150 tons, St. Mark's School field house, to Lehigh Structural Steel Co.

Rye, N. Y., 200 tons, Miriam Osborn Home, to Ingalls Iron Works.

Bayside, Long Island, 2300 tons, high school, to Lehigh Structural Steel Co.

Weehawken, N. J., 940 tons, bridge for New York Central Railroad, to American Bridge Co.

Allegany County, N. Y., 120 tons, bridges, to Lackawanna Steel Construction Corpn.

Brooklyn, 110 tons, theater, to National Bridge Works.

Binghamton, N. Y., 650 tons, post office, to Lehigh Structural Steel Co.

Orangeburg, N. Y., 330 tons, infirmary building, to Belmont Iron Works.

Camden, N. J., 100 tons, soap house, to American Iron Co.

Washington and Allegheny Counties, Pa., 120 tons, bridge, to Reliance Steel Products Co.

Montgomery County, Pa., 110 tons, bridge, to Fort Pitt Bridge Works Co.

Williamsport, Pa., 170 tons, Grit Publishing Co. building, to Belmont Iron Works.

Buffalo, 125 tons, addition to Sattler store, to R. S. McMannus Steel Corpn.

THE SOUTH

State of Louisiana, 150 tons, bridge over Tchefuncta River, to Jones & Laughlin Steel Corpn.

CENTRAL STATES

Portage County, Ohio, 120 tons, bridge, to Fort Pitt Bridge Works Co.

White County, Ind., 370 tons, bridge, to Central States Bridge & Structural Co.

Melrose Park, Ill., 825 tons, overhead crossing, to McClintic-Marshall Corpn.

Green Bay, Wis., 125 tons, lighthouse, to Lakeside Bridge & Steel Co.

WESTERN STATES

Stockton, Cal., 850 tons, city wharf and transit shed, to Ingalls Iron Works Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New Bedford, Mass., 200 tons, industrial building for Revere Copper & Brass Co.

Royalton, Vt., 180 tons, highway bridge.

Utica, N. Y., 280 tons, East End brewery.

Bridesburg, Pa., 175 tons, manufacturing building for Charles Lennig & Co.

SOUTH AND SOUTHWEST

Norfolk, Va., 3000 tons, sheet metal shop for navy yard; bids Aug. 22.

Richmond, Va., 700 tons, bridge.

Louisville & Nashville Railroad, 350 tons, bridge work in Kentucky.

Springdale, Ark., 100 tons, bridge.

CENTRAL STATES

Oxford, Ohio, 200 tons, Miami University dormitory addition.

Detroit, 800 tons, wash house and stock cellar for Stroh Brewing Co.

Hammond, Ind., 1500 tons, filtration plant.

Chicago, 225 tons, overhead crossing at Ninety-fifth Street.

Kaukauna, Wis., 175 tons, bridge.

WESTERN STATES

Boulder City, Nev., 750 tons, crane rails and miscellaneous structural steel for Bureau of Reclamation.

Buena, Wash., 270 tons, State highway bridge.

Yosemite, Cal., 150 tons, utilities building, for Department of Interior; bids Aug. 28.

FABRICATED PLATE

NEW PROJECTS

Boston, 1500 tons, pipe line.

Los Angeles, 620 tons, 4 to 8-in. black steel pipe for Mono Basin project; bids under advisement.

Limon, Colo., 100 tons, elevated tank; bids rejected and project will be readvertised.

Chicago Pneumatic Buys Mitchell Diamond Drill

PATENTS, goodwill and tangible assets of the Mitchell Diamond Drill Co., Ltd., San Francisco, have been purchased by the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, which for the past two years has acted as general sales agent for the Mitchell company. The personnel of the latter company has also been taken over, and for the present the Mitchell diamond drills, parts and fittings, as well as "ready-set" bits, will be continued at San Francisco. The announcement states that later the manufacturing operations will be transferred to the Detroit plant of Chicago Pneumatic Tool Co., where CP rock drills and pneumatic hammers are made.

Detroit Scrap Prices Remain Unchanged

DETROIT, Aug. 7.—Activity in the local scrap market continues to lag, as steel mills give no indication of a desire to make fresh purchases or to take in contract tonnages now being held by dealers. The prolonged suspension of water shipments of scrap destined for Lake Erie steel producing centers is causing congestion at the Nicholson dock at Ecorse and, unless the situation is relieved in the next few weeks, may result in an embargo on further movement of material from producers' yards to the local dock. With virtually no business to test the market prices remain nominally the same as a week ago.

Reinforcing Steel

Awards 1700 Tons—New Projects 5700 Tons

Newark, N. J., 800 tons, Prudential Insurance Co. apartments, to Rawlins Co.

Grasselli, N. J., 350 tons, building for General Aniline Works, to Rawlins Co.

Blairsville, Pa., 100 tons, State highway project, to Truscon Steel Co.

Covington, Ky., 417 tons, bridge for State Highway Department.

NEW REINFORCING BAR PROJECTS

Boston, 150 tons, city hospital unit.

Elmira, N. Y., 100 tons, grade elimination for Pennsylvania Railroad.

Buffalo, 100 tons, Cleary Creamery.

Buffalo, 500 tons, Kensington high school.

Pittsburgh, 110 tons, St. Bernard's Church; Metzger-Richardson Co., general contractor.

Bedford County, Pa., 200 tons, State road project; R. D. Thomas & Co., Pittsburgh, general contractor.

Milwaukee, 4000 tons, filtration plant.

Decatur, Ill., 110 tons, post office.

Casper, Wyo., 412 tons, tunnels and structures on Casper Canal project; bids Aug. 27.

Pipe Lines

Solvay Process Co., 61 Broadway, New York, plans steel pipe line from Wilbert-Choctaw dome, Iberville Parish, La., to new alkali plant at Baton Rouge, La., about 14 miles.

Oklahoma City, Okla., has called special election Oct. 2 to approve bond issue of $4,000,000 for steel pipe line distribution system for natural gas, with alternate proposition to acquire present system of Oklahoma Natural Gas Co., and make extensions and improvements.

Toronto Pipe Line Co., a subsidiary of British-American Oil Co., Ltd., Coutts, Alta., plans early construction of new 6-in. welded steel pipe line from oil field district at Cut Bank, Mont., to refinery of parent company at first noted place, about 36 miles, for crude oil, including steel pipe line gathering system in oil field, from wells of Montana Power Co., Nadeau Brothers and other interests to central pumping station for transmission. Cost about $500,000.

American-Michigan Pipe Line Co., a subsidiary of American Light & Traction Co., 105 West Adams Street, Chicago, has secured permit for 8 and 10-in. welded steel pipe line from gas fields in Austin pool, Mecosta County, Mich., to Muskegon and Muskegon Heights, Mich., for natural gas supply for Muskegon Gas Co., another subsidiary of same parent organization, at both places. Cost about $500,000.

Magic, Idaho, will build a steel pipe line requiring 175 tons.

Cast Iron Pipe

Brockton, Mass., has awarded 140 tons of 18-in. pipe and fittings to Donaldson Iron Co.

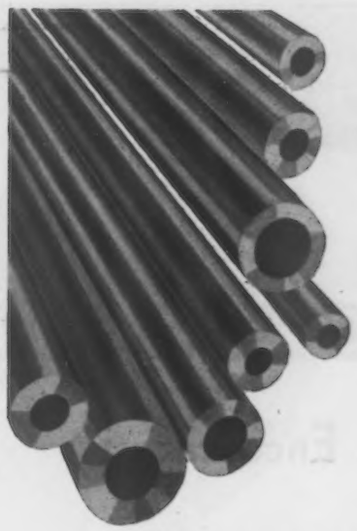
Hinsdale, N. H., contemplates installing a water system to cost about $147,000.

Columbus, Ohio, has awarded 1000 tons to James B. Clow & Sons.

Lancaster, Mo., has approved plans for water pipe line system, including waterworks station. E. T. Archer & Co., New England Building, Kansas City, Mo., is consulting engineer.

Princeton Junction Water Co., Princeton, N. J., has secured franchise for water pipe line system in Township of West Windsor, Mercer County.

Chehalis, Wash., plans about nine miles for water system. Bond issue of $110,000 has been authorized for this and other waterworks construction.



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SPACERS, BUSHINGS, Etc.

Manufacturers of BISCO Tungsten Carbide drawing dies for wire, rod and tubing.

THE BISSETT STEEL CO., INC.
945 E. 67th ST. CLEVELAND, OHIO
Cincinnati Worcester Buffalo

Littlefield, Tex., plans about 2000 ft. of 8-in. and 9700 ft. of smaller or same size for water service. Special election has been called on Aug. 29 to approve bonds for $48,000 for this and other work. H. N. Robert, Lubbock, Tex., is consulting engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 21 for 3800 ft., different size (Schedule 2896).

Gilroy, Cal., has awarded 698 tons of 16-in. to United States Pipe & Foundry Co.

Bremerton, Wash., placed 196 tons of 4 to 12-in. with United States Pipe & Foundry Co.

Los Angeles will take bids Aug. 22 on 360 tons for a city outfall sewer.

Milwaukee let contract for quantity of 10-in. to United States Pipe & Foundry Co.

Somerville, Mass., plans extensions in water pipe line. Bids will soon be asked. Fund of $50,000 has been arranged through Federal aid. J. E. Mullaney, city engineer.

Faison, N. C., closed bids Aug. 10 for 25,000 ft. of ¾ to 8-in. for water lines. William F. Freeman, High Point, N. C., is consulting engineer.

South Pasadena, Cal., plans about 10,000 ft. of 10-in. in connection with new 250,000-gal. capacity steel tank installation on Raymond Hill; also will install booster pumping machinery and accessories. John Janes is water superintendent.

Lehi, Utah, plans new water pipe line, replacing present wood stave pipe. Fund of $33,000 has been secured through Federal aid.

Soldier Summit, Utah, plans about 6 miles for main water trunk line. Fund of $30,000 has been arranged through Federal aid.

Dawson, Tex., plans water pipe line. Fund of $54,000 has been arranged through Federal aid for this and other waterworks construction, including reservoir and pumping station. A. F. Mitchell, Dawson, is engineer.

Scrap and Steel Codes Conference Proposed

A CONFERENCE between the scrap iron code authority and the iron and steel code authority will be requested to consider the mutual relations of the two industries, growing out of code administration. This action is the outcome of a meeting of the scrap iron code authority, held at Pittsburgh, Aug. 2. When the code authority considered a substantial number of petitions for exemptions from the scrap iron code, it soon was apparent that the roots of the petitions were interwoven with alleged unfair competitive practices on the part of the steel mills, in the purchase of steel, and other market conditions.

The chairman of the committee which will supervise the inter-code relations of the scrap iron code authority with other code authorities, is Joel Claster, vice-president of Luria Brothers & Co., and president of the Institute of Scrap Iron and Steel. Mr. Claster was given the power by the code authority to enlarge his committee, to include all interests that might be helpful in the situation.

The Scrap Iron Code Authority also voted against a proposal, submitted by the NRA, to pool its budget with the budgets of five other code authorities operating in the waste materials trade, with the aim of creating a central administrative agency. The code authority submitted a budget of its own to Deputy Administrator John J. Connolly, who attended the meeting, and insisted that it be given the opportunity, as soon as possible, to function and administer the code over the scrap iron and steel trade without being involved with other code authorities. At the same meeting the code authority completed its organization, in accordance with instructions from the NRA, by adopting amendments to the code, by-laws, rules and regulations for the handling of complaints by local committees, and many other legal details of organization.

PLANT EXPANSION AND EQUIPMENT BUYING

Machine Tool Dealers Encouraged By Spurt in Business

MACHINE tool dealers in several areas report a spurt in business during the past week. However, few of them are as yet convinced that this is a general condition or more than a "flash in the pan." The Cincinnati district continues to report bookings at a slow rate.

Warner & Swasey Co., as reported in detail elsewhere in this issue, has been much encouraged by the increase in bookings during the first half of this year. Company officials regard this as an indication of the breaking of the capital goods deadlock.

Automobile makers are not expected to release many machine tool orders during the next sixty days, because of their postponement of the time of model changes. Packard Motor Co., however, has inquired for a list of new tools aggregating $1,000,000 or more, but even in this case the trade does not look for early decision.

NORTH ATLANTIC

Revere Copper & Brass, Inc., 230 Park Avenue, New York, manufacturer of copper and brass tubing, shapes, forgings, etc., has let general contract to Zingerline Brothers, Front Street, Rome, N. Y., for one-story and basement addition to plant of Rome Mfg. Division, Rome, 120 x 385 ft. Cost close to $100,000 with equipment.

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until Aug. 13 for nine steel acetylene gasoline buoys, from 8-ft. diameter and 20 ft. long to 9-ft. diameter and 38 ft. long, with skeleton lantern towers, bottom counterweights, etc.; also for 12 bell buoys and three gong buoys (Proposal 46813).

Standard Instruments Corpn., New York, has been organized by Lewis G. Burnell, 435 Fort Washington Avenue, New York, and Harry Schwartzmann, 3324 Mermaid Avenue, Brooklyn, to manufacture precision instruments and tools.

Board of Education, Park Avenue and Fifty-ninth Street, New York, plans early call for bids for shop equipment, tools, furniture, etc., for Brooklyn Technical High School. Cost about $1,180,837.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 14 for one motor-driven ammonia compressor (Schedule 3043) for Brooklyn or Philadelphia Navy Yard; 240 all-metal vacuum bottles (Schedule 3034), 339 revolving stools (Schedule 3055) for Brooklyn yard; motor-driven centrifugal pumps and spare parts (Schedule 3045) for Brooklyn and Philadelphia yards; until Aug. 17, steel boiler tubes (Schedule 3063) for Brooklyn and Charleston, S. C., yards; three electric arc welding sets (Schedule 3055) for Brooklyn and Sewall's Point, Va., yards; 14 electric-operated portable pumps and spare parts (Schedule 3052) for Brooklyn, Philadelphia and Charleston yards; until Aug. 21, oil burner and spare parts, steering and rudder angles, etc. (Schedule 3054), for Brooklyn and Philadelphia yards.

Schenley Distillers Corpn., 20 West Fortieth Street, New York, has plans for rebuilding its James E. Pepper Distillery, Lexington, Ky., destroyed by fire several weeks ago. New plant will include power house, machine shop and other mechanical buildings. Cost over $500,000 with equipment. Carl J. Keifer, Schmidt Building, Cincinnati, is consulting engineer.

Signal Supply Officer, Army Base, Brooklyn, asks bids until Aug. 20 for 106,000 ft. cable and 96 reels (Circular 4).

American Smelting & Refining Co., 120 Broadway, New York, has purchased former Carrisa gold mining property at Atlantic City, near Lander, Wyo., idle for several years. Plans are under way for extensions and improvements, including new mining machinery and other operating equipment.

Board of Education, Tupper Lake, N. Y., plans manual training shop in new two-story and basement high and grade school. Fund of $300,000 has been arranged. R. R. Graham, 25 Prospect Street, Middletown, N. Y., is architect.

Water Department, Yonkers, N. Y., plans installation of new pumping machinery and auxiliary equipment in connection with extensions and improvements in waterworks station. Fund of $74,000 has been authorized for work.

General Aniline Works, Inc., Grasselli, Linden, N. J., manufacturer of chemical products, has plans for three-story addition, 115 x 180 ft. for general manufacture, three-story storage and distributing building, and top floor extension to present three-story unit. Cost close to $100,000 with equipment.

American Lamp Works, 16 Hopkins Avenue, Jersey City, N. J., has leased space in building at 2638 Cornelison Avenue, for expansion and will soon remove to new location and install additional equipment.

Donaldson Piston Corpn., Belleville, N. J., has been organized by James H. Tully and Gerald D. Peet, 11 Mill Street, to manufacture pistons for automobile and other gasoline engines, and kindred equipment.

Swift & Co., Ninth Street and Girard Avenue, Philadelphia, meat packers, have let general contract to Irwin & Leighton, 1505 Race Street, for one-story addition to packing plant. Cost about $40,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 17 for lubricating gun fittings (Schedule 2462) for Philadelphia, Sewall's Point, Mare Island and Puget Sound Navy yards.

R-S Products Corpn., 4530 Germantown Avenue, Philadelphia, manufacturer of industrial and domestic heating equipment, has acquired all assets of Ryan, Scully & Co., same address, manufacturer of similar equipment, and will consolidate with organization.

NEW ENGLAND

School Board, Lincoln, R. I., plans manual training shop in new two-story and basement high school. Fund of $200,000 has been secured through Federal aid. A. H. Humes, Record Building, Pawtucket, R. I., is architect.

Old Colony Machine Works Co., Fall River, Mass., has been organized by Alton T. Buffington and Charles A. Pardee, 150 South Main Street, to operate a general machine and repair works.

White Fuel Co., 888 E. First Street, South Boston, is in market for a coal conveyor trestle, hoisting tower, belt conveying machinery and miscellaneous equipment.

School Board, Waltham, Mass., plans manual training shop in new multi-story senior high school, for which fund of $254,000 has been secured through Federal aid. Kilham, Hopkins & Greeley, 126 Newbury Street, Boston, are architects.

C. H. Graves & Sons Distillers, Inc., 35 Hawkins Street, Boston, affiliated with C. H. Graves & Sons Co., same address, alcohol products, is arranging financing to total about $690,000, of which approximately $100,000 will be used for expansion in production.

Duplex Diesel Corpn., Boston, has been organized by F. William Andres and Henry W. Keyes, Jr., 75 Federal Street, to manufacture oil and gas engines, and parts.

OHIO AND INDIANA

John W. Little, Plymouth Building, Cleveland, architect, has plans for extensions and improvements in local building to be equipped for a distillery for company whose name is temporarily withheld. Cost about $35,000. Wallace W. Leipner, same address, is consulting engineer.

Fisher Body Co., East 140th Street, Cleveland, has approved plans for one-story addition for fabrication of steel bodies for Chevrolet and Pontiac automobiles. Cost about $100,000 with machinery. Lincoln R. Scafe is general manager of Cleveland works.

City Council, Clyde, Ohio, plans installation of pumping machinery and accessory equipment, filtration and water-softening machinery, pipe lines, etc., for extensions and improvements in municipal waterworks. Fund of $142,000 has been arranged. George Champe & Associates, Nicholas Building, Toledo, Ohio, are consulting engineers.

Sidney Elevator Mfg. Co., Sidney, Ohio, has been organized by W. M. Littlefield and Carl F. Berger, care of Midland E. Hussey, Thompson Building, representative, to manufacture elevator equipment, parts, etc.

Material Division, Air Corps., Wright Field, Dayton, Ohio, asks bids until Aug. 13 for propeller hub nuts, spacers, rings, cones, etc. (Circular 35); until Aug. 14, tank assemblies (Circular 5); until Aug. 15, 230 housing

Microstructure of medium grain size nickel silver. Mag. 150X Etch—10% H_2SO_4 (Electrolytic)

The Grain Size of RIVERSIDE NICKEL SILVER *is* CONTROLLED

. . . . To Ensure Proper Drawing Qualities

Articles or parts which are to be deep-drawn, spun or stamped, require a properly alloyed, soft, smooth-drawing Nickel Silver, ductile enough to "flow" to the contour of the tool, but sufficiently dense in structure to prevent strain, roughness, open grain, or orange peel effect detrimental to surface finishes. To supply a metal which must combine utmost ease of forming with a suitable surface for polishing or plating after fabrication, requires expert processing and a nicety of balance between deep-drawing quality and fine grain structure.

For these applications, Riverside Nickel Silver is produced under laboratory supervision to a controlled grain size, through micrographic determinations as to the best structure for a customer's individual needs.

The Riverside Metal Company has specialized in the production of wrought Nickel Silver since 1897. If you have a problem involving deep-drawing and surface finishing—or any other problems pertaining to the use of Nickel Silver—this Company can offer you expert assistance through experience data, productive and metallurgical facilities.

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SHEET · STRIP · WIRE · ROD

ORIGINAL *and* ONLY MAN COOLER

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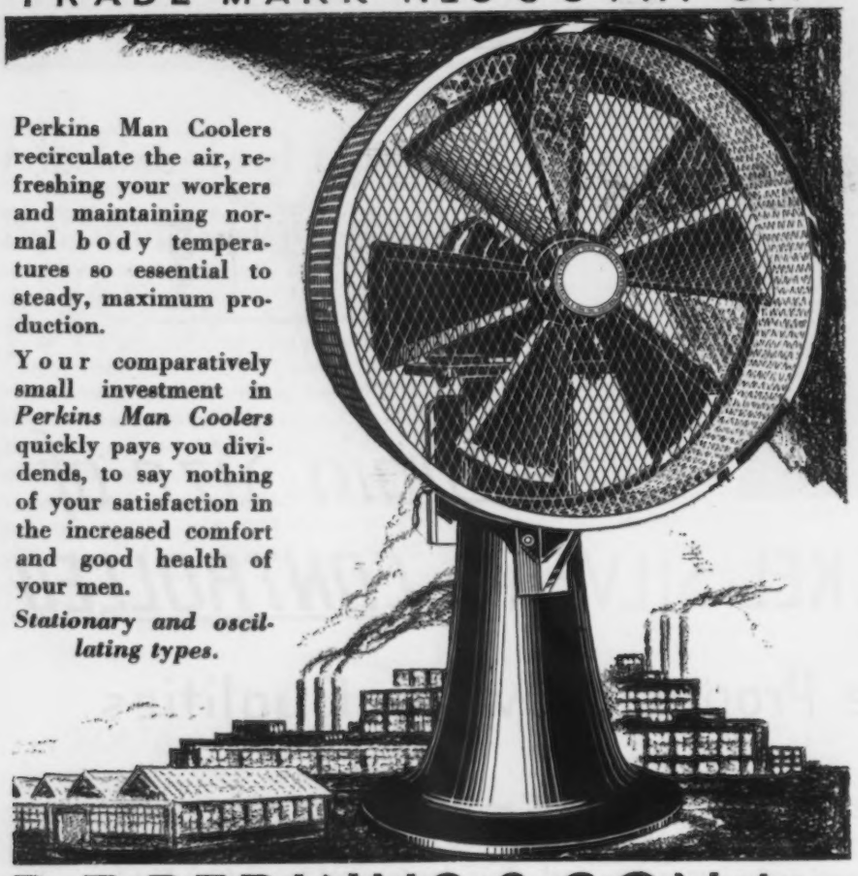

Perkins Man Coolers recirculate the air, refreshing your workers and maintaining normal body temperatures so essential to steady, maximum production.

Your comparatively small investment in *Perkins Man Coolers* quickly pays you dividends, to say nothing of your satisfaction in the increased comfort and good health of your men.

Stationary and oscillating types.

B.F. PERKINS & SON, *Inc.*

Engineers and Manufacturers

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assemblies, contact printer micro switch, and 230 handle assemblies, contact printer lid (Circular 32); until Aug. 30, one envelope assembly (Circular 39).

Winton Engine Corpn., 2160 West 106th Street, Cleveland, manufacturer of Diesel engines, parts, etc., has let general contract to N. J. Burnham, 1453 Alameda Avenue, for one-story and basement addition, 30 x 175 ft. Cost about $45,000 with equipment.

Mutual Sheet Metal & Heating Co., Akron, Ohio, has been organized by John P. Wittek and Harry I. Jackson, 1173 Lampa Avenue, to manufacture sheet metal products for heating service, heating equipment, etc.

Cummins Engine Co., Columbus, Ind., C. L. Cummins, president, manufacturer of Diesel engines for railroads, parts, etc., has plans for one-story addition, 85 x 250 ft., for locomotive assembling, with trucks, framework and other parts to be purchased from outside interests; company Diesel engines will be installed in new shop, and locomotives moved out under own power. Cost close to $100,000 with equipment.

Midland Machine & Tool Co., Inc., Marion, Ind., has been organized by Troy A. and Glen V. Wiley, both Marion, to manufacture tools, special machinery and parts, jigs and fixtures.

◀ BUFFALO DISTRICT ▶

Trayer Bolt Co., Elmira, N. Y., manufacturer of shackle bolts for automotive service and kindred specialties, heretofore occupying part of local Willys-Morrow plant, has taken over larger space in factory of James Mfg. Co., where operations will be expanded.

Cruisaire Aircraft Corpn., Buffalo, has been organized by James R. Spraker, 64 Dorchester Road, and Earle W. Rearwin, 21 Rugby Road, to manufacture airplanes and parts.

Speas Mfg. Co., 2600 Front Street, Kansas City, Mo., manufacturer of acids, etc., has acquired tract, 200 x 500 ft., near Lyndonville, N. Y., as site for new plant. Cost close to $80,000 with machinery.

Central School District, South Otselic, N. Y., plans installation of manual training shop in new two-story and basement high and grade school. Fund of $125,000 has been arranged. Hallenbeck & Sargent, 912 Harrison Street, Syracuse, N. Y., are architects.

◀ SOUTH ATLANTIC ▶

Grinnell Co., Inc., 240 North Highland Avenue, Atlanta, Ga., manufacturer of water sprinkling systems, valves, fittings, etc., asks bids on general contract until Aug. 15 for one-story addition, 80 x 440 ft., and improvements in present factory. Cost over $80,000 with equipment. Robert & Co., Bona Allen Building, are architects and engineers. Headquarters of company are at Providence, R. I.

United States Engineer Office, Savannah, Ga., asks bids until Aug. 31 for new Savannah Bluff lock and dam, Savannah River, near Augusta, Ga., including 7570 lb. iron castings, 5290 lb. bolts, 102,480 lb. steel reinforcing rods, lock gates, lock valves, operation building with lock-operating machinery, pipe railing and guard fences, etc. (Circular 23).

Potato Products Co., Quitman, Ga., recently organized, care of Conrad O. Hersam, Walton Building, Atlanta, Ga., consulting engineer, will soon purchase machinery for new plant for manufacture of starch, for which superstructure is scheduled to begin early in fall. Plant will include power house, machine shop pumping station. Cost close to $200,000 with machinery. Company plans construction of similar plants in other locations in South.

United States Engineer Office, Jacksonville, Fla., asks bids until Aug. 13 for one dredge pump Diesel engine (Circular 105).

◀ WESTERN PENNA. ▶

City Controller, City-County Building, Pittsburgh, asks bids until Aug. 20 for two new municipal incinerator plants, one adjoining Brilliant pumping station and other on site in Twenty-first Ward, including furnaces and power equipment, conveyors, hoists, loaders and other machinery. Plans at office of city architect, address noted. Department of Public Health will be in charge. Cost about $1,000,000.

Associated Gas & Electric Co., Rockwood, Pa., plans rebuilding local power plant recently destroyed by fire. Loss over $100,000 with equipment. Headquarters of company are at 61 Broadway, New York.

School District of Wilkinsburg, High School Building, Wilkinsburg, Pa., H. R. Schweinberg, secretary, asks bids until Aug. 18 for 500 to 800 steel bleacher seats.

Borough Council, Smithton, Pa., plans new pumping station, filtration plant, pipe lines, etc., for new water system from Youghiogheny River. Financing has been arranged.

◀ WASHINGTON DISTRICT ▶

Quartermaster, Marine Corps., Washington, asks bids until Aug. 13 for valves, faucets, air cocks, sewer pipe fittings, shower heads, etc. (Schedule 64).

National Advisory Committee for Aeronautics, Langley Field, Va., asks bids until Aug. 30 for construction of 8-ft. high-speed wind tunnel, 154 ft. long, lined with steel plates, with facilities for developing air flow of 500 miles per hr., equipment to include 18-blade, 16-ft. diameter propeller with 8000-hp. motor. Bids will also be asked for one-story shop unit, 24 x 66 ft.

Winand-Pikesville Distillery Co., 1920 Belair Road, Baltimore, is arranging financing aggregating $788,996, considerable part of fund to be used for new plant units and equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 21 for one drill press, one valve facing machine, 25,000 lb. spikes, 10,000 lb. screw spikes, 1350 ft. buoy chain, nickel steel billets, paint cans, paint pails, flash lights, etc. (Schedule 2986).

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Oct. 3 for new electrical distribution system for

"Proved better than the more costly steel dies," says Ford

This giant die of Nickel-Chromium Cast Iron stamps out the front fender of the current model Ford.

NICKEL-CHROMIUM CAST IRON

effects economies in Ford plant!

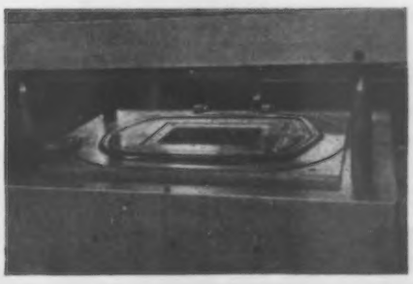
FORD chemists and metallurgists have been studying Nickel-Chromium Cast Iron with typical Ford thoroughness. Result: dies of Nickel-Chromium Cast Iron are now stamping out a wide variety of parts for the current model Ford.

Economy is one of the primary advantages of these dies. "The relatively low cost of cast iron," says the Ford laboratory report, "and its ability to fill out intricate as well as very thin sections, and the ease with which it may be machined, recommend it for many uses."

"Alloy cast irons," the report continues, "have been used for some time for sheet forming dies and have, in many instances, proved to be better than the more costly steel dies."

The most satisfactory and wear-resisting composition used at the Ford plant contained 2.00% nickel and 0.70% chromium. In some of the larger dies, excellent results were obtained by "stiffening up" the alloy composition to 3.00% nickel and 0.90% chromium.

Nickel Cast Iron is characterized by its uniform high hardness, its great strength and dense structure and high degree of wear resistance. At the same time it is readily machinable. It takes a high polish—and materially reduces galling and streaking in the formed metal.



Ford radiator shell forming die, made of heat treated Nickel-Chromium Cast Iron.

This combination of desirable features has caused Nickel-Chromium Cast Iron to be widely adopted as the preferred die material by leaders in the automotive field and by the sheet metal manufacturing industry in general.

Our casting specialists will gladly cooperate in selecting compositions of Nickel Cast Iron that are best suited to your particular die requirements.

•

THE INTERNATIONAL NICKEL COMPANY, INC.
Miners, refiners and rollers of Nickel.
Sole producers of Monel Metal
67 WALL STREET, NEW YORK, N. Y.

naval repair basin, Navy Yard, Pearl Harbor, T. H. (Specification 7604). Cost about $300,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 14 for one tractor with crane attachment (Schedule 3059), 18,000 lb. steel wool (Schedule 3061) for Sewall's Point, Va., navy yard; until Aug. 21, 40 forced-draft blowers, turbine-driven, and spare parts (Schedule 3041) for Eastern and Western yards.

SOUTHWEST

United States Engineer Office, Kansas City, Mo., asks bids until Aug. 13 for two electric drills, one electric grinder, one bench stand, one valve face grinder (Circular 37), 192 steel folding tables (Circular 38); until Aug. 15, five rollers for dredges, complete with bearings (Circular 49), line shaft equipment and hardware, including shafting, pulleys, anvils, shovels, pans, wheelbarrows, etc. (Circular 47); until Aug. 16, one diamond core drill press, one diamond core drill bit, one diamond saw and grinding lap, one impact machine, one abrasion machine, one harness-testing machine, 15 cast iron spheres and sieves (Circular 48).

Common Council, La Plata, Mo., has plans for new municipal electric light and power plant, using Diesel engine generating units, and for electrical distribution system. Fund of $100,000 has been secured through Federal aid. E. T. Archer & Co., New England Building, Kansas City, Mo., is consulting engineer.

Board of Education, Clinton, Okla., plans manual training shop in new multi-story high school, for which bids are being asked on general contract until Aug. 14. Fund of $160,000 has been arranged. W. T. Vahlberg, Oklahoma City, Okla., is architect.

Wylie-Stewart Machinery Co., 729 West Noble Street, Oklahoma City, Okla., has filed plans for one-story storage and distributing plant. Cost about $24,000 with equipment.

Common Council, Sweetwater, Tex., has called special election on Aug. 28 to approve bond issue of $160,000 for extensions and improvements in municipal waterworks, including installation of pumping machinery and auxiliary equipment, pipe lines, etc., Hawley, Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

SOUTH CENTRAL

City Council, Shreveport, La., asks bids until Aug. 15 for new municipal incinerator plant, including furnaces, hoists, conveyors, loaders and other mechanical equipment. Cost about $150,000. Clarence E. Olschner, Shreveport, is architect.

Common Council, Clinton, Miss., plans installation of pumping machinery and accessory equipment, pipe lines, etc., for extensions and improvements in municipal waterworks. Fund of $100,000 has been secured through Federal aid.

Common Council, Lutcher, La., plans installation of pumping machinery and accessories, pipe lines, fittings, etc., for new municipal waterworks. Financing is being arranged for fund of $69,000.

FORTY-EIGHT YEARS OF WELDING EXPERIENCE

DON'T *fumble* WITH RIVETS ON NON-FERROUS METALS

Use a High-Speed, Low-Cost T. G. Welding Press on Brass, Aluminum and other Alloys

No. 1 Welding Press for rapid welding of light gauge stock.

No. 4 Press, a heavy duty machine designed for multiple projection welding.

Compared with the production obtained from efficient, high-speed Thomson-Gibb Electric Welding Presses, other methods of assembling brass and aluminum parts seem slow, awkward, *fumbling!* Welding non-ferrous metals has become as safe and economical as welding steel. On clean metal, the new Thomson-Gibb Welding Presses weld more securely, more uniformly, faster and cleaner than ever before. They present the surest, quickest way to get more units per hour at less cost per unit.

For specific cost and performance data on welding your product under your conditions, fill in the memo below and attach it to your letterhead.

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Thomson-Gibb Electric Welding Company
162 Pleasant Street, Lynn, Mass.

Gentlemen:

☐ Please ask your nearest engineer to arrange for an appointment at our plant.

☐ Please MAIL information on the welding of

Product ..... Metal .....

Approximate dimensions .....

Desired production per hour .....

MICHIGAN DISTRICT

Chevrolet Motor Co., 3044 West Grand Boulevard, Detroit, has plans for new one-story machine shop. Cost over $30,000 with equipment. Albert Kahn, Inc., New Center Building, is architect.

Board of Public Works, Ann Arbor, Mich., plans installation of pumping machinery and accessories, pipe lines, etc., in connection with new sewage treatment works. Fund of $379,000 is being arranged for work.

Leader Tool & Die Co., 4196 Bellevue Avenue, Detroit, has been organized by Adam Ozak, 5209 Helen Avenue, and associates, to manufacture tools, dies and kindred mechanical equipment.

Gil-Boat Corpn., Holland, Mich., recently organized by John W. Kramer, 62 West Eleventh Street, and associates, will soon begin operations for production of motorboats and other steel boats in plant lately acquired and now being remodeled.

Trenton Valley Distillers Corpn., Trenton, Mich., has purchased adjoining property for one-story addition for storage and distribution. Cost over $35,000 with equipment.

MIDDLE WEST

Armstrong Paint & Varnish Works, 1330 South Kilbourne Avenue, Chicago, has let general contract for three-story addition, 62 x 127 ft.; W. C. Bennett, 326 West Madison Street, is architect. Power house will also be extended, improvements to include new coal bunkers, coal-handling machinery and other equipment, for which L. B. Perkins, 189 West Madison Street, is architect. Cost over $75,000 with equipment.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until Aug. 14 for three cable reel trailers, all-steel construction (Circular 7), terminals (Circular 6), cases with loading coils (Circular 5).

New City Packing & Provision Co., 942 West Fulton Street, Chicago, meat packer, has leased building in South Water Market district and will remodel for new plant. Cost about $75,000 with equipment.

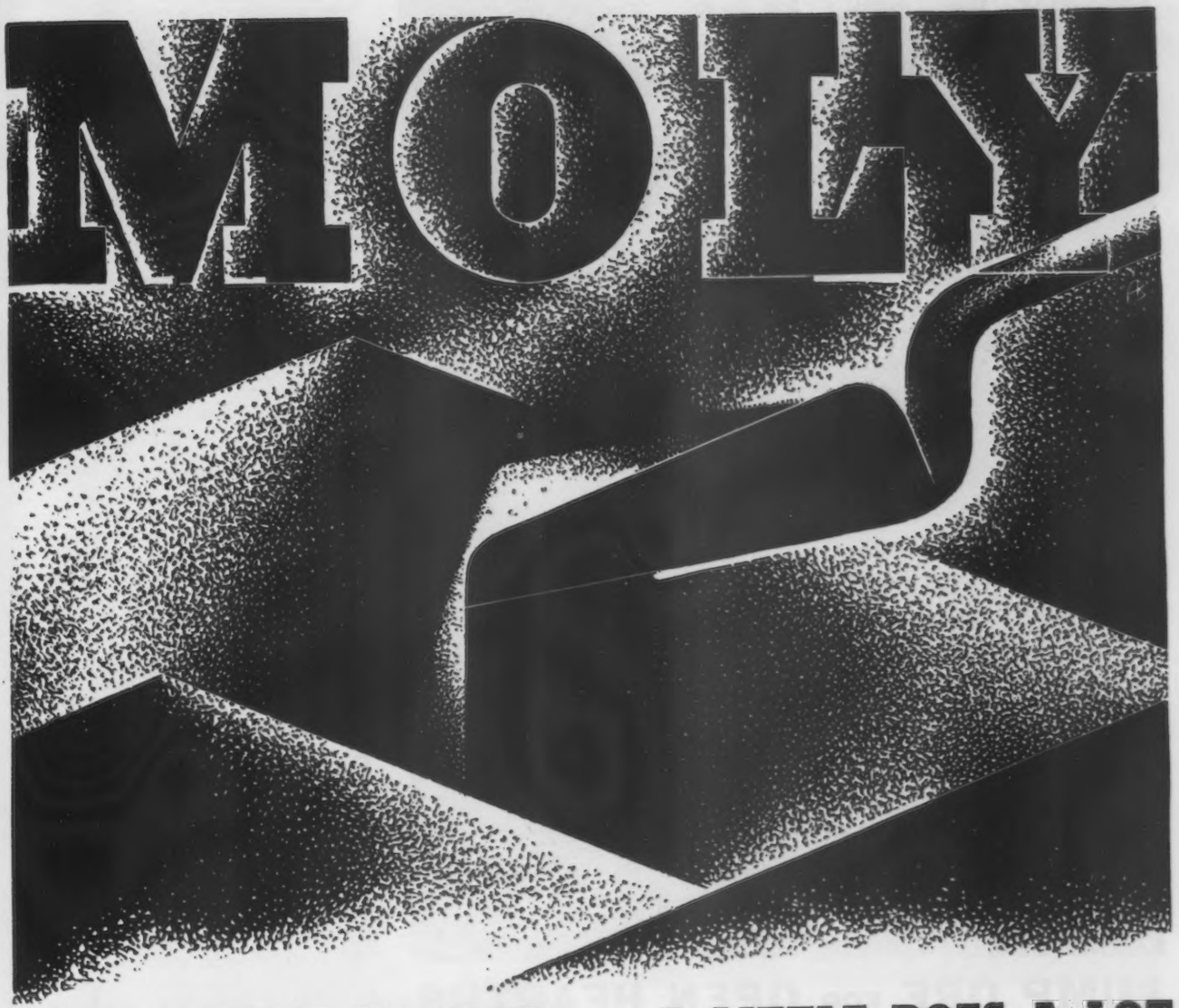
Thermo Control Devices, Inc., Room 1714, 111 West Monroe Street, Chicago, has been organized by George A. and Leo W. Wheeler, to manufacture heating control and other precision devices and equipment.

Bureau of Reclamation, Denver, asks bids until Aug. 20 for four flow meters for measuring water through 115,000-hp. hydraulic turbines, with one portable indicating manometer, one water manometer, tool cabinet; also similar equipment for measuring flow of water through 55,000-hp. hydraulic turbine (Specification 623-D).

Eastern Minnesota Power Co., Pine City, Minn., plans extensions and improvements in steam-operated electric generating plant, also in branch Diesel engine-generating station at Milaca, Minn. Transmission lines will be extended and improved. Cost over $40,000.

A. E. Staley Mfg. Co., Decatur, Ill., manufacturer of soya bean oil and allied products, plans addition for oil mill and refinery unit. Cost over $75,000 with equipment.

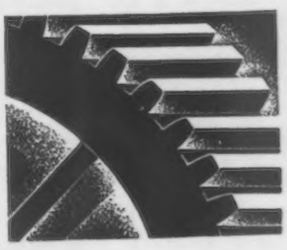
Common Council, Glidden, Iowa, has been authorized at special election to arrange fund of $47,500 for new municipal electric light and power plant.



LIKE CEMENT IN SAND . . . A LITTLE DOES A LOT

ONE of the great advantages of the use of Molybdenum is in the fact that a small amount of this versatile alloy does a great deal of work.

In cast iron, for instance: An interesting example is that of a 3000-pound cast-iron gear, the teeth of which had to be hobbed from the original casting. Previous to the application of "Moly," a total of 84 pounds of alloy had to be added to the iron to produce a suitable mix for this purpose. By using Molybdenum, the total alloy addition was dropped to 27 pounds, the alloy cost reduced considerably and the resultant product had a better finish, greater strength, toughness and wear resistance.



In *any* iron, or steel, "Moly" can be depended on to enhance the desirable qualities. Easier machinability, without loss of hardness or toughness, stronger welds, greater corrosion resistance may be added to those already mentioned. And invariably the improvement is worth far more than the cost of the small quantity of Molybdenum required.

"*The Moly Matrix*" is a new house organ designed to help executives and engineers to keep up to date with the new developments in Molybdenum metals. A post-card request will put you on our mailing list. And our metallurgists and modern laboratory facilities in Detroit are ever available to aid in your alloy experiments or problems. Write also for these interesting new books: "*Molybdenum in* 1934" and "*Molybdenum in Cast Iron*—1934 *Supplement*."

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LUMP ORE FOR OPEN HEARTHS
IRON ORE • PIG IRON • COAL
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THE CLEVELAND-CLIFFS IRON CO., CLEVELAND O.

Quaker Oats Co., Third Street, N. E., Cedar Rapids, Iowa, has superstructure under way for six-story and basement addition to mill, 80 x 130 ft. Cost over $100,000 with machinery. General contract was recently let to Loomis Brothers, 313 Eighth Avenue, S. E. Headquarters are at Chicago.

PACIFIC COAST

Petri Wine Co., Battery and Vallejo Streets, San Francisco, has plans for new one-story winery at Escalon, Cal. Cost about $40,000 with equipment. H. C. Baumann, 251 Kearny Street, San Francisco, is architect.

Water and Power Bureau, 207 South Broadway, Los Angeles, D. P. Nicklin, purchasing agent, asks bids until Aug. 15 for transmission line hardware for overhead conductors, including double clevis fittings, arcing rings, extension links, etc. (Specification 1462).

Pacific Meat Co., North Columbia Boulevard and Peninsula Avenue, Kenton, Ore., meat packer, plans rebuilding part of plant recently destroyed by fire. Loss about $40,000 with equipment.

Hughes-Mitchell Processes, Inc., 618 Majestic Building, Denver, has been chartered with capital of $1,000,000 to erect new chemical processing plant on property recently purchased at Torrance, near Los Angeles, including shop units for reduction of lead and zinc metals, using electric furnaces and accessory equipment. Cost over $400,000 with machinery. Lafayette M. Hughes and Thomas A. Mitchell, first address noted, are heads.

Sumner School District, Sumner, Wash., has plans for new one-story manual training shop, 45 x 75 ft., at local high school. Mock & Morrison, Perkins Building, Tacoma, Wash., are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 17 for suction and discharge oil hose (Schedule 3030) for Mare Island Navy Yard, 32,200 lb. manganese-nickel bar (Schedule 3037) for Mare Island and Puget Sound yards; until Aug. 24, five centrifugal motor-driven pumping units (Schedule 3064); until Aug. 24, five 50-gal. capacity steel tanks (Schedule 3065) for Puget Sound yard.

Western Sugar Refinery, 2 Pine Street, San Francisco, has awarded general contract to Barrett & Hilp, 918 Harrison Street, for one-story additions to refineries at Spreckels and Manteca, Cal., and improvements in present units. Cost about $70,000 with equipment.

Saticoy Lemon Association, care of Albert J. Thille, Santa Paula, Cal., president, has asked bids on general contract for one-story, sawtooth roof type packing and distribution plant near Montalva, Cal. Cost about $45,000 with boilers and accessory power equipment, conveyors, loaders, etc. Roy C. Wilson, 112 South Mill Street, Santa Paula, Cal., is architect.

FOREIGN

British Iron & Steel Co., Ltd., Cariff, England, plans addition for production of wire, rods and allied specialties. Cost over $500,000 with machinery.

L'Air Liquide, Ltd., Paris, France, manufacturer of nitrogen products, has arranged with State Government, Sao Paulo, Brazil, for concession for new nitrogen fixation works in that State, for which site will be secured at once. Plant will include power house, machine shop and other mechanical units. Cost over $400,000 with machinery.

Atlantic & Gulf Sugar Co., recently organized, care of Cuban Cane Products Co., 123 Front Street, New York, has acquired 12 cane sugar mills of last noted company in Cuba, at recent sale in bankruptcy, and will take over property at once. Plants will be remodeled and improved, with installation of new machinery. Cost about $1,000,000.

Department of State Railways, Buenos Aires, Argentine Republic, asks bids until Aug. 27 for vertical lathes and accessories for locomotive and car shops.

Employment in Iron and Steel Industry Reached Peak in June

EMPLOYMENT in the iron and steel industry reached the highest level in four years in June, when 455,966 persons were at work, or 6604 more than in May and 117,820 above the total in June, 1933, according to the American Iron and Steel Institute.

Wages and salaries in the industry in June amounted to $49,466,664, a decrease of $2,429,267 from May, because of a small reduction in hours. The average hours of work per week declined from 36.6 in May to 35.7 in June, and average earnings were 63.9c. an hr. in June, compared with 64.6c. in May and 47.3c. in June, 1933.

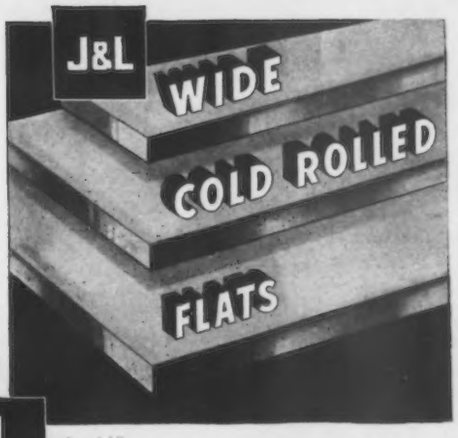
While the operating rate in the industry was only 16 per cent higher in June than it was a year before, employment had increased 35 per cent, total wages 66 per cent and the average hourly earnings 35 per cent. At the same time the average work week was reduced 9 per cent. Employment was virtually the same as in 1929.

The June figures compared with June of last year follow:

	June, 1934	June, 1933	Per Cent Change
All employees...	455,966	338,146	+35
Wage earners...	415,547	305,239	+36
Wages	$40,630,314	$24,441,054	+66
Weekly hours of worker	35.7	39.4	—09
Average earnings an hour..	63.9c	47.3c	+35
Operating rate..	52.68	45.37	+16

J&L TURNED AND GROUND SHAFTING

Turned and Ground Shafting, as made by Jones & Laughlin, is precision stock conforming to the most exacting specifications. It is strong and durable. It is straight and true to size, with a bright, flawless finish. Uniformity—maintained by strict and constant control of every step in production—is an important feature of the practical usefulness of **J&L** Turned and Ground Shafting. You will get notable performance, too, from **J&L** Turned and Polished Shafting and **J&L** Cold Drawn Shafting.



The adaptability of **J&L** Wide Cold Rolled Flats to many uses presents opportunity for important savings. Widths up to 12". Thicknesses up to 2½".

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Determining Shaft Bore Alinement by Cathetometer

(Concluded from Page 25)

its axis, i.e., in the direction of its future rotation, by an angle of 60 deg., 90 deg. and 120 deg. respectively, and the measurement repeated for each of these positions. By further rotation, and measurement, the original position is resumed; thereby one set of measurements is concluded. Now, both measuring devices are pushed further inside the object under test, that is, toward its center, by a distance of, say, 20 cm.; the measurements are then repeated for each angle of rotation.

This procedure is repeated in the same manner until the center of the shaft is reached (to be ascertained by means of the measuring tape). This stage having been reached, the internal measuring device is taken out of the shaft and the latter turned around by an angle of 180 deg., in such a manner that its other opening faces the cathetometer. The inside measuring device is then inserted again and the entire process repeated as described in the foregoing until the center of the shaft is again reached. In this manner, sets of measurements are obtained according to the distances chosen and from these by comparison of corresponding points of measurement, the various thicknesses between inside and outside surfaces may without further complication be determined, and thus also any misalinement of the bore.

Prospects of the Tennessee Valley Region

IN discussing the promise of the Tennessee Valley region, Edwin C. Eckel, geologist of the Tennessee Valley Authority, Knoxville (in Geologic Bulletin No. 1, T.V.A.), stresses two points affecting the future. One of these is that the whole world seems to have embarked upon new lines of chemical as opposed to purely mechanical progress, leading to the creation of new products and the use of new raw material. The other is that in supplying cheap electric power electrochemical and electro-metallurgical industries may be developed that were heretofore impossible of profitable operation owing to the high cost of the electricity.

In touching on the coal and iron resources of the region, he suggests that coal may be used more extensively for the manufacture of various coal tar chemical products; that iron may be utilized very largely in the form of different special irons and steels, including ferroalloys. The T.V.A. area, he adds, may produce ferromanganese, ferrochrome, ferrosilicon and other ferroalloys on an extensive scale.

Extensive deposits of bauxite, with proper technical methods, he believes, may furnish cheap supplies of aluminum metal, of alumina cement and of alum cake for water purification. The creation of an extensive electrolytic zinc refining industry, he says, is entirely feasible. The cement and clay industries can be amply supplied, in his opinion, with limestones of maximum purity, with clay deposits of various types and with feldspars and kaolins, and he regards the availability of cheap electricity as a means of securing high temperatures and as likely to render many technical processes industrially feasible that are now merely theoretically possible.

Deposits of natural pigments of various colors he mentions as favoring local paint manufacture, and local making of heavy chemicals, alkalis, soaps and similar products he lists as a feature of future progress. Likewise, in touching on fertilizer raw materials, the slates and feldspars of the Georgia and North Carolina regions are offered as sources of potash.

Throughout the outline of the prospects of T.V.A., here reviewed, emphasis is placed on the expectations of developments growing out of the large supply of low cost electric power.

New Separators Developed For Exide Batteries

BATTERIES equipped with separators made of a new material named Exide Mipor (registered, U. S. patent office) are being announced by the Electric Storage Battery Co., Philadelphia. This material is in a form of vulcanized rubber in sheets, and is permeated with countless microscopic passages permitting free diffusion of the electrolyte. It is stated that these passages are so small that the most minute solid particles of active material are prevented from passing through.

These separators are not affected by the electrolyte solution, and are immune to heat developed in a battery. They have the strength necessary to withstand vibration and rough conditions of service to which batteries are frequently subjected. Tests are said to show that the new material lasts indefinitely, functioning as a permanent insulator, yet permitting complete diffusion of the electrolyte. The Exide Mipor separators will be used exclusively in Exide-Ironclad batteries for electric industrial trucks, railway air conditioning and car lighting, mining locomotives and trammers, electric street trucks and for marine service.

Chain Belt Co., Milwaukee, has appointed Jenison Machinery Co., Twentieth and Tennessee streets, San Francisco, as a distributer of Rex construction equipment in northern California.

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